

SUPPLEMENT.

The Mining Journal, RAILWAY AND COMMERCIAL GAZETTE:

FORMING A COMPLETE RECORD OF THE PROCEEDINGS OF ALL PUBLIC COMPANIES.

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No. 2297.—VOL. XLIX.

LONDON, SATURDAY, AUGUST 30, 1879.

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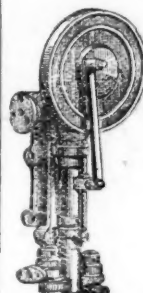
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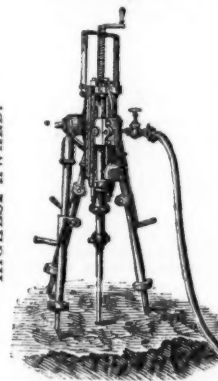
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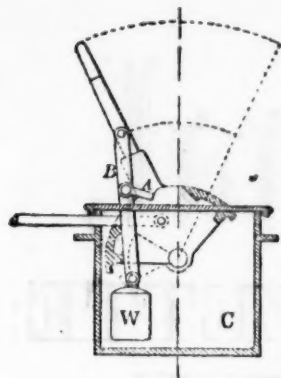
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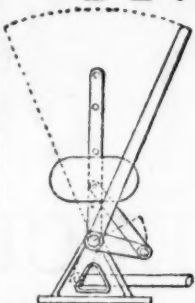


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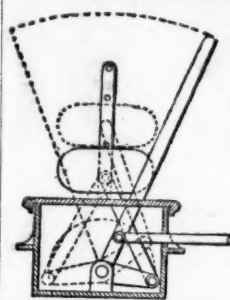
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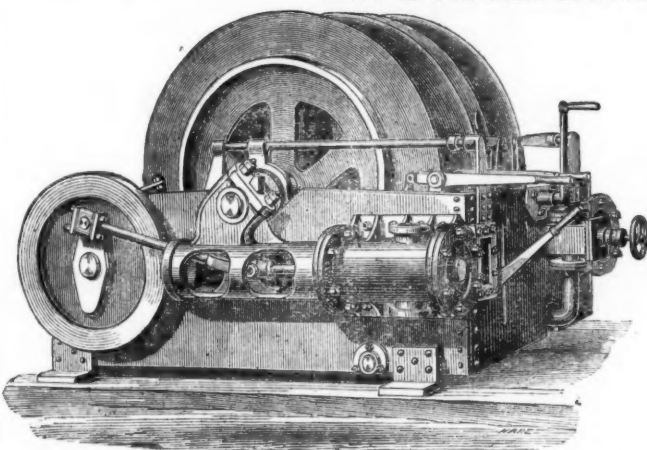
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The following letter has recently been received from the Ebbw Vale Company:—

GENTLEMEN,—I have much pleasure in stating that in the execution of your contract to drive, for the Ebbw Vale Steel, Coal, and Iron Company (Limited), a cross measure drift from the Old Coal to the Rock Vein Coal, in the Glyn Pit, at Pontypool, you did so with dispatch, and to the entire satisfaction of all concerned. The distance driven was 463 yards in about 15 months.

[The size of the above heading is 9 ft. by 13 ft.]

Yours faithfully,

Ebbw Vale Works, Monmouthshire, July 5th, 1878.

ROBERT JORDAN, Mining Engineer,

Ebbw Vale Company's Collieries and Mines.

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Original Correspondence.

ON SAFETY LAMPS.

SIR,—The subject of safety-lamps is one of the most important in relation to coal mining, not only in its bearing in preventing explosions of fire-damp, but also as being an instrument which has led to the extraordinary development of British and foreign coal fields within a comparatively short period, and to the creation of other industries which depend more or less on a supply of coal in their operations.

The principle of wire gauze as adopted for safety-lamps is due, it is understood, to the researches of Sir H. Davy, though the late George Stephenson invented a lamp at the same period on the same principle, but differing in form and materials from that of the Davy. Dr. Clanny shortly afterwards introduced his lamp, having a glass cylinder round the lower part of the lamp. By this arrangement a better light was obtained than with the Davy, the wire gauze being still used for the upper portion of the lamp. The Stephenson lamp has been much improved since its first introduction. In point of safety it is generally admitted to be superior to the Davy and Clanny for use in fiery mines, though inferior in illuminating power to the Clanny lamp.

What is known as the Scotch lamp has a gauze of larger diameter than usual, the largest size being 3½ in. diameter, 12 in. long; illuminating power equal 45 of a standard sperm candle, and 33 per cent. of the light without gauze. The second size is 3 in. diameter, 11½ in. long, equal 33 of standard candle, and 32 per cent. of the light. The smallest size is 2½ in. diameter, 10½ in. long, illuminating power 27 of standard and 36 per cent. of the light itself. The apertures are .28 in an inch, or 784 to a square inch. The comparative safety of these and the Davy lamp increases as the diameter of the gauze is diminished.

The Davy lamp was introduced in 1815. The gauze cylinder is 1½ in. diameter and 8½ in. long, having 784 apertures to a square inch. The illuminating power is 21 of a standard sperm candle, being 36 per cent. of the light. The Davy will explode in an inflammable mixture of fire-damp and air when placed in a current of 6 ft. per second, and is said by some experimenters to pass the flame in an explosive current of 5 ft. per second. Much depends in these experiments on the purity of the gas, and its freedom from carbonic acid and nitrogen, as to the sharpness of its firing. When the lamp is exposed to an explosive current the ignited gas within is forced through the overheated gauze and fires the outside atmosphere; or it may be placed in an explosive mixture with very little current; the lamp in this case becomes filled with blue flame; the gauze is highly heated, and eventually may fire the mixture outside. Notwithstanding these imperfections the Davy lamp is still largely used in the coal mines of England, Wales, and Scotland, though a better knowledge of its insecurity is now abroad, and something more reliable is desired for the purposes of illumination under all conditions of gaseous mines. The Davy lamp is considered to be a good indicator of the presence of fire-damp, owing to the facility with which the air enters the lamp and the products of combustion escape; this applies only to a still atmosphere, and where no active current exists, or where shot firing or jerking the lamps do not operate in causing the ignited inflammable mixture inside to pass through the gauze to the equally explosive mixtures surrounding it.

The Clanny lamp affords a good light, this being its chief advantage; the illuminating power is fully one-half of a standard candle. This lamp will fire an explosive current of 8 ft. per second. The products of combustion come in contact with the air entering above the glass cylinder, and hinder the free entrance of air to feed the flame; this renders the lamp less susceptible than the Davy in trying for gas. In fiery mines the Clanny lamp is objected to on account of the liability of the glass to fracture, and the cylinders not fitting close at the ends.

The Stephenson lamp, as now used, consists of a glass cylinder inside, fitted with a perforated copper cap, through which and the gauze cylinder the products of combustion escape. The wire gauze cylinder outside of the glass is a little larger in diameter than the Davy, with a sometimes smaller mesh. The supply of air to the flame is admitted through small holes in the lower ring of the gauze part of the lamp, which passes afterwards through the gauze. The supply of air and escape for the products of combustion being thus limited, if any increase of combustion takes place inside the lamp from the presence of gas the light is quickly extinguished. This constitutes the important feature of the "Stephenson": when surrounded, accidentally or otherwise, by a stagnant, or partially stagnant, explosive mixture it is self-extinguishing. It has proved most valuable in fiery mines, where outbursts of gas are not unfrequent, particularly in some Yorkshire mines. In a velocity of 10 to 12 ft. per second the lamp will not fire an explosive current, but the light shortly dies out.

The Mueseler lamp is adopted in some of the coal mines of this country, but is more extensively used in those of Belgium and France. It consists of a thick annealed glass cylinder around the flame, surmounted by wire gauze tapering upwards; within the gauze a copper chimney is fixed, also tapering, which receives the products of combustion, these pass off afterwards through the top of the gauze. The supply of air passes through the lower part of the gauze cylinder, afterwards through a ring of gauze fixed between the bottom of the chimney and the side of the lamp. When the Mueseler is held in a slanting position or in a strong current the chimney draught does not operate. The lamp then acts in an explosive current much the same as the Davy, and under these circumstances is unsafe.

The object of the writer is not to hold up any of the lamps that have been mentioned as models of safety, but rather to indicate as far as that can be done the requirements for a reliable lamp, safe under all the ordinary conditions of gaseous mines. The requirements are a high illuminating power, capability of being placed in an explosive current of any velocity up to 30 ft. per second or more without exploding the exterior atmosphere. Most of the lamps of recent invention have been designed to secure these objects, some of them it is believed with improvements in detail would prove to be excellent safety lamps in practice, sufficiently so to avoid that source of danger (the imperfect lamp) which has in times past been one of the chief causes of explosions.

Abstract of 43 Safety-Lamp Experiments at Hetton Colliery, made in a box 20 ft. in length, 11½ in. by 7½ in. in section:—

No. of Expt.	Description of lamp.	Kind of gas used.	Velocity, feet p. sec.	Duration of expt. in sec.	Expl. or none.	Remarks.
1	Common Davy lamp	Mine gas	7	30	None.	
2	ditto	ditto	8	14	Expld.	
3	ditto	ditto	13½	6	ditto	
4	ditto	Made gas.	7	49	None.	
5	ditto	ditto	7	12	Expld.	
6	ditto	ditto	8.3	27	ditto	
7	With shield on 2 in. high.	ditto	9	5	ditto	
8	ditto	ditto	9½	5	None.	
9	Shield on as high as gauze	ditto	11½	14	Expld.	
10	Clanny Lamp	ditto	8½	45	None.	
11	ditto	ditto	9	45	Expld.	
12	ditto	ditto	10	30	ditto	
13	Stephenson lamp	ditto	10½	62	ditto	after expts. glass broke
14	ditto	ditto	11½	12	ditto	It broke glass
15	ditto	ditto	12	7	ditto	Glass whole.
16	Mueseler lamp	ditto	6	5	None.	Went out.
17	ditto	ditto	6½	6	Expld.	
18	ditto	ditto	7	4	None.	Went out
19	ditto	ditto	9	2½	Expld.	Very sharp.
20	Eloine's lamp	ditto	10	8	None.	Went out.
21	ditto	ditto	10	30	ditto	Went out

The experiments show that a Davy lamp placed in an explosive current of 8 feet per second fires the gas on the outside; the shield 2 inches in height is of little service in preventing explosion. The Clanny lamp exploded the exterior atmosphere in a current of 9 feet per second. The Stephenson lamp exploded the surrounding air under a current of 10½ feet per second. The Mueseler lamp exploded

under a current of 6½ feet per second, passing the flame with more facility than the Davy. Eloine's lamp did not communicate the explosion in a current of 10 feet per second.

Abstract of 52 Lamp Experiments at Hetton Colliery, third series, Oct. 14, 1867:—

No. of Expt.	Description of lamp.	Kind of gas used.	Velocity, feet p. sec.	Duration of expt. in sec.	Expl. or none.	Remarks.
1	Davy lamp	Mine gas.	11½	2	Expld.	
2	Stephenson lamp with shield	ditto	11½	5	None.	Went out.
3	ditto	ditto	21	25	Expld.	
4	Morison's No. 1 lamp	ditto	20	2	None.	Slanted from current, went out.
5	ditto	ditto	35	2	ditto	
6	Morison's No. 2 lamp	ditto	20	2	ditto	
7	ditto	ditto	35	1	ditto	
8	Ritson and Bell's lamp	ditto	27	105	ditto	Continued to burn
9	ditto	ditto	35	6	ditto	Slanted to current, went out.
10	Daglish and Flood's No. 1.	Made gas.	30	51	ditto	Gont. to burn
11	ditto	ditto	35	30	ditto	
12	ditto	No. 2.	35	40	ditto	
13	ditto	ditto	35	15	ditto	
14	Glover and Call's lamp	Mine gas.	35	15	ditto	
15	Sharp and Young's	Made gas.	27	2	Expld.	
16	with short conical gauze.	ditto	30	90	None.	

* Flame passed through the broken glass.

Mr. Morison's No. 1 lamp is a modified Stephenson-lamp, having the glass outside. His No. 2 lamp is a modification of the Glover and Call's. Both lamps are extinguished when exposed to an explosive current. Messrs. Daglish and Flood's No. 1 is a Davy lamp modified, having an external brass cylinder covering the gauze, excepting the lower part, which is surrounded with glass. Their No. 2 lamp is a modification of the Clanny lamp, with a similar brass cylinder surrounding the gauze. These protecting cylinders may be applied to all Davy or Clanny lamps, rendering them safe lamps in explosive currents.

M. E.

EXPERIMENTS WITH MINERS' SAFETY-LAMPS.

SIR,—I shall trouble you with some remarks on safety-lamps after you have more fully reported the trials referred to in last week's Journal. I expect that trials will have been made with the lamps slowly rotating, so that the gauze might have some little time to cool. A current of 500 or 1000 feet per minute, causing the flame to impinge upon one point, does not give the same chance if the lamp was turned.

AN ENGINEER.

[Some further details concerning the experiments at Brynna are published in to-day's Journal, and we need scarcely say that from our correspondents' great practical experience any observations which he may make will be at once acceptable to us, and valuable to our readers.]

THE HISTORY OF THE SAFETY-LAMP.

SIR,—It has become too much the practice of the executives of so-called scientific societies to permit the reading of papers which on the face of them are merely advertisements of inventions in which the writers and their friends are interested; and I am particularly led to this remark by the paper on safety-lamps, by Messrs. William Smethurst, F.G.S., and James Ashworth, mining engineers, contained in the recently issued part of the Transactions of the Manchester Geological Society, the evident object of which was to eulogise the Smethurst chimney and Ashworth's large Mueseler. The paper in question is by no means uninteresting, although the experiments, if they may be dignified with that name, which they made add extremely little to the knowledge already published. Some of their facts, moreover, are put forward in a manner which is calculated to cause misapprehension. They say that papers on safety-lamps have been read before kindred societies, experimenters have been made both by committees of mining institutes and privately by mining engineers, and in one instance by a Belgian Royal Commission, and yet in no instance except the latter have the experiments so made resulted in any practical good. Only those lamps approved of by the Commission referred to, and made according to the proportions specified in the decree, are allowed to be used in Belgium in mines giving off fire-damp.

Now, are Messrs. Smethurst and Ashworth aware that the result of the over-meditation in Belgium, which they seem so much to admire, is that the loss of life, whether taken on the number of persons employed or on the number of tons of coal raised for each life lost, is greater in Belgium than in this country. This is a fact which tells rather against their proposed introduction of the Smethurst chimney and Ashworth Mueseler. Their tabulated statement as to the time and conditions under which various lamps explode really teaches nothing, because the several experiments are unconnected with each other, and no details are given as to how the tests were made. Their historical matter as to Clanny's 1813 lamp being the first lamp ever taken into an explosive atmosphere without accident, and their reference to the first lamps of Stephenson and Davy, have been so many times repeated that it is really unfair to put a society like the Manchester Geological to the expense of reprinting again. However, I should not so much object to this but for the fact that although I have carefully read the paper I cannot discover what are the improvements in the Mueseler which Mr. Ashworth has made. It seems to me that any ordinary Mueseler would be equal to his, and that the Liège Mueseler which he exploded must have had some defect which would have been readily discernible had it been examined.—*Manchester, Aug. 20.*

D. J.

ROCK BORING MACHINERY.

SIR,—As it appears to have been now thoroughly shown that machine boring is cheaper than hand boring, I should be glad to learn what is the smallest first cost at which half a dozen drills can be introduced into a mine, the average distance of the headings from the boiler-house being 200 fms. I notice drills advertised cheaply, but as soon as I begin to enquire I learn that there must be air compressors, tubing, and many other things, so that the drills themselves form but a small item in the total amount to be expended. One of the last borers I have heard of is one manufactured at Bishop Auckland, which is offered for 10*l.* 10*s.* a machine, but I cannot ascertain how much steam is employed, or if compressed air is the motor what air compressor is used. Indeed, I do not know whether steam is used at all, for from the remarks made by some who have used it I should not be surprised if it be nothing more than the old Abegg drill which was described many years ago in the *Mining Journal*, but which never received the attention it deserved.

The Abegg drill is not now protected by patent, and could be made by any engineer and sold at a good profit for 5*l.* No steam, compressed air, or anything of the kind is required with the Abegg drill, and its power to penetrate either hard or soft rock is almost incredible. Taking 20 holes 4 ft. deep, I believe four men would get through the work more quickly than with the Eclipse drill and compressed air; not that the latter drill would not have the advantage in each separate hole, but because with the Abegg drill the work is more regular and continuous. I have myself seen Mr. Abegg put a hole by his own manual strength alone through a solid piece of granite 6 in. thick in two minutes less a few seconds, and that hole was 1½ in. diameter, and as round and smooth as possible; and the great recommendation of Abegg's drill is that the exertion in using it is less than in ordinary hand drilling.

I think I can give a description that will enable any working engineer to make it. The Abegg drill consists of a rod and a tube, the interior of the tube being made with a square threaded female screw, and the exterior of the rod being formed into a square threaded male screw to take into the female. The outer end of the rod has the usual arrangement for affixing the drill; the outer end of the tube is furnished with a collar and a spike or spikes to hold against the rock or standard. The inner end of the female screw has four L-shaped handles attached to it so as to permit of the female screw being turned round to force out the male. The drill point being placed in the position of the intended hole, and the back end of the tube being fixed against a suitable support, the handles are pulled round, and the male screw in being forced forward drives the drill

into the rock by abrasion on the same principle as the Diamond drill. In use the drill has many peculiarities—in the first place it is surprising how small an amount of force is required to drive forward the drill into very hard rock owing to the use of the screw; then there is scarcely any wear on the screws, one pair running hundreds of feet without injury. But the most surprising thing is the way the drill attacks the rock, the hardened steel apparently cutting almost as fast as the diamond points (perhaps the whole of the steel cuts whilst there are only a few diamonds in the crown). The drills which I saw in use were 2 points, and worked excellently.

From what I have read of the Bishop Auckland drill the male screw is so arranged that the drill proper can be affixed at either end, which makes it unnecessary to work back the screw, but the labour of this is really so small that the alteration is scarcely worth consideration, especially as it adds a little to the cost of the machine. It has been estimated that the saving by Abegg's machine, as compared with ordinary hand labour, is fully 20 per cent. in the cost of drills alone, and the men can certainly get through the work with little more than half the fatigue. If some Cornish mine adventurers were to have them made and hire them out to the miners, agreeing to receive payment out of the extra wages earned, they could, I am sure, do a good business, and they would add to their own profits, while the outlay will, in my belief, be found to be less for supplying 50 men with Abegg drills than for putting in two steam or air drills and a suitable compressor, even if the steam for working the latter be given for nothing.—*Truro, Aug. 22.*

TRIBUTER.

PATENT HAND-POWER ROCK DRILL.

SIR,—It is our intention in future to guarantee our Patent Hand-Power Rock Drills in the following way:—If purchasers find themselves unable to obtain the practical results claimed we are willing to undertake contracts at the same price per fathom driven as paid by our customers for ordinary hand labour, and, failing to obtain rapid advance and to prove the advantages of the machine, agree to take it back.

As we should like to spread this notice, we shall be glad if you can find room in the next issue of your widely circulating Journal to mention it.

THOS. B. JORDAN, SON, AND MEIHE.

London, Aug. 27.

WHEELS FOR WATER MOTIVES.

SIR,—I think "Adventurer" may find much useful information about wheels for water motives in Moleworth's Pocket-book of Engineering Formulae, and published by Mr. Spon, of Charing Cross, also in Templeton's Workshop Companion; and as to turbines useful information may be afforded him in the pages of Descriptive Catalogue of Leffel's Improved Double Turbine Water-wheel, and made by McKenzie and Sons, Hibernia Wharf, Victoria Quay, Dublin, and to be had by post of them, or at their London office in Holborn Viaduct. Looking through their Catalogue I note that one of their 6½ inches (diameter) wheels gives with 160 cubic feet (about 1000 gallons) per minute, and with 90 feet head of water, over 23-horse power.

ADVENTURER.

ALLEGED DISCOVERY OF POTASH SALTS.

SIR,—Our attention has been drawn to a paragraph in the *Mining Journal* of Aug. 16, quoting from the Hamburg Correspondent of Aug. 1, in which it is stated that similar discoveries of potash salts to those at Stassfurth-Leopoldshall, in Germany, have recently been made near Lüthten, in Mecklenburg-Schwerin; and that "at a depth of only about 150 ft. gypsum, which covers the salt layers, was reached on the estate, and according to the opinion of experts, salts as valuable as those at Stassfurth, and in similar quantities, can be raised at small expense." To our knowledge this statement is incorrect. No such discovery has yet been made anywhere near Lüthten, although a boring is now in course of execution in that neighbourhood by this company for the Mecklenburg Government. The boring was commenced on July 6, and is now down to a depth of 365 ft., the gypsum having been reached at 321 ft. So far the boring has been entirely successful, but no salts have yet been reached, and it is, therefore, not likely that any experts would hazard the opinion above mentioned, nor would any competent man assert that because gypsum happens to be one of the various formations overlying the potash salts in the potash salt basin of Stassfurth-Egeln and Aschersleben, it necessarily follows that similar salts will be found wherever gypsum is met with.

As the statement quoted in your Journal is, therefore, undoubtedly misleading, we shall be obliged by the insertion of this letter.

P. SCRATCHLEY,

Secretary, Continental Diamond Rock Boring Company.

London, Aug. 27.

WEIGHTS AND MEASURES—THE TON OF 21 CWTs.

SIR,—An important conference has just been held, as you are aware, in the Guildhall in connection with the Association for the Reform and Codification of the Law of Nations. Among the interesting papers read was one on the subject of weights and measures, and this is a matter which, I think, might very well occupy the attention of those engaged or interested in the metal trade.

My main object in addressing you is to say a few words with respect to the peculiar unit of weight mentioned above. Originally intended, no doubt, for the exclusive benefit of the smelter, I fail to see any reason for its continuance except such as might be applied with equal force to any other unit, for if the combination of smelters is so coherent as to make the apparent advantage of 21 cwt. to the ton an effective one, the same combination would be available whatever the unit. Unless, therefore, for some occult reason, it does not appear that the 21 cwt. ton had any overpowering claim to support from that quarter, while sellers would esteem of no small benefit the adoption of a unit more nearly resembling those in force in other countries.

Our supply of copper, for example, is drawn very largely from countries using the metric system of weights, with its ton and centner of 2000 and 100 metric pounds respectively, while I believe in Australia and the United States the ton of 2000 lbs. is already or quickly becoming the standard. In no country does it appear that such a cumbersome unit is employed as that under discussion, and it is strange that with our enormous import trade this and other extraordinary units, of limited and special application, should not long ere this been swept away. At present produce weighed and estimated according to the system in force in the producing country is brought here, probably in English vessels, at a freight of so much per imperial ton, and then sold according to the trade ton of 21 cwt. The labour of bringing these to a common standard might be greatly shortened, and much of it avoided by the adoption of a different unit.

Slow as we are at effecting changes of this kind, and tenuous of the most inconvenient system if we are only accustomed to it, there are not wanting signs of activity. The efforts of some enlightened and energetic members of the corn and flour trades have secured the adoption of a unit of weight under the name of the "central or new hundredweight"—being 100 lbs. This has been legalised by an Order in Council, and is gradually coming into use. The ton of 2000 lbs. is sanctioned also, as named above, in the United States, the Australian and I believe some other colonies.

Hence a suitable and recognised unit is already in existence, and I, for one, would prefer the radical reform involved in the adoption of the metric centner and ton. I should rejoice at the simplification which would result from the abolition of the 21 cwt. system, and the adoption of the central and ton of 2000 lbs. The Council of the Association referred to above unanimously adopted a report of the special committee favouring the introduction of the central here as in the United States, and further recommended the assimilation of the pound to the half kilogramme, so as to establish the basis of a decimal system uniform in all countries.

The advantages of such a change are so well recognised theoretically (though so little practically) that it is unnecessary to insist on them, and I trust, Sir, that you will grant your valuable assistance towards the abolition of this troublesome 21 cwt. ton, and the substitution of the much simpler, and for many reasons preferable, ton of 2000 lbs., with the central of 100 lbs. of half a kilogramme each. I should be glad to see what any of your corre-

spendents may have to say on the subject, and the publication of this letter will, I trust, lead to a useful discussion, which may possibly end in securing the desired—
Aug. 22.

COPPER REDUCTION.

REVIEW OF THE DIFFERENT PROCESSES OF REDUCING COPPER ORES.

SIR.—Having endeavoured to point out the pecuniary advantages derivable from the judicious mining and reduction of copper in Southern Arizona, in my communication of May 2, I will now proceed to consider the *modus operandi* for bringing the copper into a marketable condition. The question of reduction resolves itself into two heads—Smelting, and the wet or hydro-metallurgical processes; and before deciding which of these methods to employ serious consideration must be given to all the circumstances and conditions of the case, such as the percentage of copper in the ore, nature of the gangue, natural fusibility, facilities for obtaining extraneous fluxes, solvents or precipitants, and their cost; wood and charcoal, their combustibility and cost; fire-clay or other refractory material for lining furnaces, whether obtainable within easy distance and at reasonable cost, together with the probabilities of reliable supply of skilled and unskilled labour, &c., but above all, the skill, experience, and integrity of the manager should be ascertained beyond the shadow of a doubt, as without this very essential element the most favourable conditions for success will, in all probability, result in disastrous failure.

No general rule can be laid down to determine what percentage of ore can be worked more profitably by one method or the other, inasmuch as circumstances of locality affecting the cost of fuel and the price of iron must in each case be taken into account; but it may be assumed that in cases where the ore is of high grade—say, over 30 per cent. copper, fuel cheap, fluxes available, and all other facilities at hand—smelting will be the most desirable mode of reduction, and this is accomplished in various ways, such as the Swansea and Chili reverberatories, and the Castilian or cupola blast furnaces, in general use on the Continent of Europe, of which there are great numbers and varieties of designs, drawings, and descriptions of them may be met with in Muspratt's and Ure's dictionaries and other reliable works on the subject. Besides the furnace, other plant and preliminary operations are requisite under certain conditions, such as crushing and concentrating before introducing into the furnace, as is done in Cornwall, where a large percentage of the ores are too poor to ship to Swansea, and are concentrated to one-third of their original weight— $\frac{1}{3}$ to $\frac{1}{4}$ per cent.—before leaving the mine, while in some parts of the Continent, where the ore is of low grade and of a highly pyritic character, it is subjected to a series of four or five roastings in heaps in the open air to burn off the excess of sulphur before it is smelted in the black copper and matte furnace. This is a long and tedious operation, requiring five or six weeks for its accomplishment, and from the large quantities of sulphurous acid gas evolved creates a most intolerable nuisance, and destroys much vegetation in the neighbourhood of the works. In Swansea this preliminary roasting is done in specially constructed reverberatory furnaces. When the ores have been brought up by these roastings to the requisite standard of richness—say, 35 to 40 per cent.—they are introduced into the black copper furnace with a proper admixture of slag and other fluxes, and run into two-third bars of black copper of 94 to 96 per cent., and rich matte one-third, containing 45 to 60 per cent. of copper, which is again roasted on the heaps or in a reverberatory before being returned to the furnace for reduction into bar copper.

In case where the ores consist of native copper or in an oxidised condition, and as rich as at Clifton, Arizona territory, Lake Superior, &c., roasting operations are unnecessary, and the copper is smelted direct into bars at one operation, but these must be regarded as an instance of exceptional smelting facilities, and inexperienced operators should be careful not to be seduced into attempting this short cut to final results on sulphide and other ores unsuited for this mode of treatment, or they may discover to their cost, when too late, that they have become possessed of the fiddle without the fiddler. In connection with this class of smelting, I may mention that within the last year or two, at the Clifton Works, plates of copper have been successfully employed in lieu of fire-brick, &c., for constructing the hearth of the furnace, the well known property of copper for rapid solidification being made available by simply leaving the outer surface exposed to the cooling action of the atmosphere. This truly bold and original idea of smelting copper in a copper vessel has happily met with deserved success, but I regard its application to sulphide ores as a very hazardous experiment, the chemical conditions being so widely apart.

The chief advantages the wet processes have over smelting are in the economy of fuel and time. To extract copper from low grade ore by smelting five or six furnace or roasting operations are necessary when dealing with ordinary ore (three-fourths of which may be regarded as sulphides), and from 1 to 3 tons of coal is consumed for each ton of ore treated, while for the various wet processes a single calcination (oxidising) roast, in which not over 300 lbs. of fuel (wood) is consumed for each ton of ore, is the only furnace operation required to obtain the copper in a precipitated form known as cement copper, and for which there is always a ready market.

The most important item of cost in these hydro-metallurgical processes is the iron employed to separate the copper from its solutions, the same amount of iron being required to precipitate a ton of copper whether from a poor or rich ore—1500 lbs. of the former to 1 ton of the latter, but when scrap-iron in sufficient quantities is not available it may be very cheaply produced in the form of spongy iron from ores which are frequently met with in the vicinity of copper mines, as in Southern Arizona.

The various wet methods of copper extraction may be divided into two classes—those in which the previously naturally oxidised ores are treated with hydrochloric or sulphuric acid to dissolve the oxide of copper, and those in which the sulphide ores, after a preliminary roasting, are calcined with salt or sulphate of soda, by which the copper is converted into chloride or sulphate. Both these methods effect a pretty thorough extraction of the copper, but the cost of the reagents employed preclude (except in certain favoured localities) the use of these processes, a difficulty which has been met in a most satisfactory manner by the recent introduction of a most beautiful and economical process by Dr. T. Sterry Hunt, of Boston, and Mr. James Douglas, jun., of Phoenixville, Penn., where it may be seen in successful operation under the able management of the latter gentleman. By this mode of working the chemical and solvent reagents become regenerated in the process, and are used over and over again, instead of being lost in each operation as in the other wet processes.

The following are some of the most prominent advantages attending this system of working:—

- 1.—It is adapted to all ores of copper, while that by roasting with salt can only be applied to sulphides.
- 2.—It does not require the addition of acids, salt or sulphate of soda to each charge of ore, the cheap solvent employed being constantly reproduced.
- 3.—The bath (or solvent) being neutral certain impurities, such as arsenic, &c., are not taken into solution, and a purer copper thereby obtained.
- 4.—The solution being neutral there is no unnecessary consumption of iron in the process of precipitation. Moreover, as the result of the action of the protochloride of iron of the bath on the protoxide of copper in the ore one-third of the copper is obtained as protochloride and two-thirds as dichloride. As the latter requires for 100 parts of copper but 45 parts of iron it is found in practice that one-third less iron is consumed than in the other wet processes.

The first operation in working on the Hunt and Douglas system is to grind the ore by Cornish rollers or any other cheap method for dry crushing till it will pass a sieve of 16 to 20 to the linear inch; if ground too fine it will not filter with sufficient rapidity. The second is to roast the powdered ore in a powerful oxidising furnace such as I designed while working this process in Serbia some three years ago (and have recently introduced into this country), by which the copper is rapidly deprived of its sulphur, arsenic, &c., and con-

verted into the state of protoxide by means of a strong blast of hot air uncontaminated by the products of combustion introduced at the spot where the ore is being sprinkled into the furnace by suitable machinery, which oxidises the copper and drives off the volatile constituents in the form of sulphurous arsenous acids, &c., and at the same time keeping the particles of ore in constant suspension and motion by the force of the blast much more effectually than can be accomplished by any system of raking either by hand or by machinery, and at a very trifling cost—that of the power to drive the blower. By this method of roasting 20 tons of sulphide ores per day may be thoroughly oxidised with two and one-half to three cords of wood and the attendance of two workmen, one to feed and the other to discharge. The third part of the process is to remove the oxidised ore, which, on examination, will be found of about this composition—Copper as sulphate, 25 parts; copper as oxide, 70 parts; copper as sulphide, 5 parts—total, 100 parts, into wooden vats of a capacity to hold 4 to 5 tons each, furnished with false bottoms, which are covered with a filtering medium of sand and gravel or other suitable materials, as well as a pump communicating with the space below the false bottom. Here it is submitted to the action of the bath or solvent, which is prepared from sulphate of iron, 250 parts; common salt, 320 parts; water, 2000 parts. The sulphate is decomposed into protochloride of iron by the action of its equivalent of chloride of sodium, the excess being required to keep the copper in solution. Heat is applied by means of steam, and a temperature of about 150 Fahr., kept up for five or six hours, during which the hot solvent acts on the oxide of copper in the ore, converting it into one-third parts protochloride and two-thirds parts dichloride of copper, and precipitating the iron in the form of peroxide. As it filters through the false bottom (perforated for this purpose) the pump brings it back and sends it again through the body of ore in the vat. At the end of the operation the iron will have disappeared and the copper replaced it in the solution, leaving not over the half of 1 per cent. in the tailings, which are then thrown away.

The fourth and last part of the operation is to carry the copper solution to another vat containing scrap-iron of any kind, old broken castings, wrought-iron scraps, or preferably, spongy iron made on the spot. In the course of a few hours the copper will be precipitated on the surface of the iron, while its equivalent of the latter is taken into solution, and thereby regenerates and prepares the bath for acting on another lot of roasted ore. This is repeated until nearly all the iron has been taken into solution, and got rid of in the decomposing vat as oxide, as explained. The cement copper is then removed, washed in clean water, dried and packed off to market. The entire operation from mining to marketable copper being accomplished within three days; unlike the tedious and disagreeable operation of smelting.

If desirable the cement copper may be run into bars of B. C. (best selected) copper in the usual manner at a trifling expense, as it contains little or no impurities (as explained); 96.5 per cent. copper was the average quality obtained by my operations in Serbia, while some samples assay as high as 99.5 per cent.

When it is considered that the plant required for this mode of treatment does not cost much over one-half that for smelting; the facilities it offers for working low-grade ores, low cost of reduction, great saving of time, and freedom from all those troubles arising from fluxes, furnace materials, &c., I think the advantages of this system of working must be manifest to the most superficial observer, more particularly in the case of very low-grade ores which it treats to a profit when smelting would entail certain loss in consequence of the ruinous amount of fuel and fluxes required.

Assay Office, Tucson, A.T., July 19.

W. T. RICKARD, F.C.S.

LAKE SUPERIOR COPPER MINES.

SIR.—I copy from our local paper the product of Lake Superior Copper Mines for July, as follows:—

	Tons	1345	155 lbs.
Calumet and Hecla	153	1000	
Oceola	137	10	
Franklin	130	1220	
Quincy	130	760	
Atlantic	75	150	
Allouez, tributs			

The other mines of the region who make no report produce about 200 tons more, or 2170 tons of mineral, or nearly 1750 tons of ingot for the month. This, you must notice, does not look much like falling off on the part of the Lake Superior companies. After watching the tone of your articles on copper for some months I have come to the conclusion that mines somewhere must soon cease to produce this metal. There is a point below which no company can go in producing cheap copper, and the question of who is to go out of the field will evidently soon have to be tested. Hitherto, as the price has receded the mines have produced more metal, in other words, have lit the other end of the candle. This, as you know, and have been pointing out, will afford but little temporary relief. Some of the Australian companies have curtailed their production, signifying their intention to be counted out of the race for low prices. Cornwall scarcely figures in the world's production of copper, and the sooner more of her copper mines are closed the better for the shareholders who expect returns for capital invested. And small copper mines anywhere, unless they are exceptionally rich, can stand no chance to succeed in future.

The Cape Copper Company have marked their dividends down a notch, and from last report, but for a heavy curtailment of expenses, would have had to give way still further. I do not notice that the lower levels are yet out of hard ground, or into rich ore, and it will be interesting to watch the career of this mine in future. The pressure will come first on the small companies, and then on the smaller of the large ones, while the strong fight must be between Spain and the West Coast of this continent. Chili, probably, can scarcely help herself, she must sell something, and has but little beside copper left to sell. But it is past my comprehension why copper companies insist on supplying the world with more than it wants of the metal, unless, indeed, some few of the heavier concerns are desirous of pushing the others to the wall, with the idea eventually of monopolising the business. I suppose London companies control three-fifths of the copper production of the world, and just now it looks as much like "dog eat dog" as possible.

It is quite questionable, Mr. Editor, whether we are not on the eve of a lower range of prices for metals than people have been used to until very lately. Look at the price of steel and iron, and if there was plenty to do at present prices quite a number of works could find a margin for profit. Cornwall squirmed with tin at 60s. per ton, and would be more than glad to get 40s. to-day.

Look at the price of wheat to-day in England, with the prospect of a deficient harvest ahead, and it would seem, too, that the day of high prices for wheat was past. The hard times in the United States drove people from the East to the wheat-growing sections of the North-West, and that country has been rapidly filling up with farmers. For the year ending June, 1878, over 2,000,000 acres of land were taken up, nearly all by actual settlers along the line of the Northern Pacific Railroad, and the influx in 1879 is still greater. Farms of 10,000 and even 20,000 acres are in cultivation, and wheat fields of 1000 acres are to be met with. A late paper says, and truly, "Not only in Wisconsin, Minnesota, Dakota, and Montana are there millions of acres of rich, black prairie waiting only the advent of man to convert them into fields of golden grain, but the greater part of the southern portion of British North America is composed of as fine wheat-growing soil as there is in the world. This enormous country is looked upon by many to-day in the same manner that Minnesota and Dakota were ten years ago, as a barren ice-bound desert. Only nine years since it was the property of the Hudson Bay Company, under a charter granted in 1669 to 'Prince Rupert and nineteen other gentlemen,' on the easy terms that they should give to the sovereign every time he chose to visit the country 'two black bears and two fine elks.' Now men are just beginning to appreciate that these 346,000 square miles of country are good for something else besides the supply of furs and the furnishing of a scanty subsistence to bands of roving Indians." The British Dominion is but beginning to feel the influx of settlers; by-and-bye there will be wheat to export in large quantities from that section.

Russia is a wheat growing country, and it really seems that cheap bread for the near future is inevitable, regardless of the pressure on the English farmer.

I will return to this subject again, with your permission.

Calumet, Mich., U.S.A.

J. D.

NEW ZEALAND KAPANGA GOLD MINING COMPANY.

SIR.—Can any of your readers, shareholders in the company, or any one else, inform me as a shareholder what the directors are doing? No reports are published, or information given—which, to say the least, is a very unsatisfactory way of proceeding towards the general body of shareholders.

X. Y. Z.

MONOPOLY OF THE WORLD'S CONSUMPTION OF STEEL BY SWEDISH LAPLAND.

SIR.—Permit me to supplement my correspondence in the Journal of the 16th and 23rd. inst. by notice of the opening address of the President of the Chemical Section of the British Association at the meeting on the 21st. inst., which stated "The Bessemer process did not eliminate phosphorus from pig-iron, extremely small proportions of which render steel cold-short, so that the process has hitherto only been applicable to the rarer and costlier kinds of pig-iron produced from exceptionally pure ore." In showing the immense reduction in price of steel rails I omitted stating that cast-steel tyres, which 25 years ago were 120s. per cwt., are now reduced to 18s. and 25s. per cwt.

I now approach the cost of transport from Gellivare to an always open shipping port, and to Great Britain. It is well known that an exclusively mechanical genius inspired Richard Trevithick to construct the first locomotive, in 1802, its improvement and working being reserved for George Stephenson, in the year 1814, a purely mechanical mind, by no means schooled by a higher class of professional education. The thirst after gain impelled the late York silk-mercer, and other "noves homines," to throw themselves into a vortex of financial phrenzy, amassing fortunes as if by enchantment, so that if we take a retrospective view of the railway epoch, we shall not experience much difficulty in discovering a system of gambling unexampled in any age or clime. As the rapid acquisition of mammon was unquestionably at the bottom of our railway system, no serious study has in consequence been given to the technical part, fully confirmed by a Government report.

I am prepared with matter to fill columns on this head, technically, financially, and in a commercial sense. But harken to what the Money Market Report in the Times of July 12 last states—"Railway directors are running riot with the money of the shareholders; full and clear details of railway business are zealously withheld, alike from proprietors and the general public, the investing classes, under existing state of affairs, never having other than a speculative security." The last Board of Trade Report on the Railways of the United Kingdom, dated July 19 last, states "It is to be feared an unusual retrogression in railway affairs is not at an end, and which may exhibit less favourable results to the shareholders before it passes away." The most eminent and deep-thinking continental railway authority, the late Von Hartwich, showed the diminished confidence in railway investments. The system proposed is the formation of a trajectory, or railway, with a series of undulating planes, ellipses, or epicycloids, by force of gravity, and automatic mechanical power, attaining a very high velocity, with the most absolute immunity from leaving the rail, in either case not possible under actual system. I introduce no new principle, as a Government report, prefaced "startling and unexpected results," upon a trajectory, or railway, identical with what I now submit, and other important data fully confirm the feasibility and immense advantage of my extremely simple system. What higher evidence can I adduce than that of the late Nicholas Wood, Robert Stephenson, his partner Richard Bagnall, and others, without a prolix reference to the Greek philosopher and mathematician Pythagoras in the 6th century before the Christian era, Archimedes 287 years before Christ, or other modern philosophers, physicists, and mathematicians, as Galileo, Newton, Coulomb, d'Alembert, Huygens, Kepler, Hutton, Lardner, &c. The question arises shall the shortest route be taken from the Gellivare estate to an always open port in the North of Norway, or shall it be confined to Sweden, having for outlet or shipping port the West of Sweden, equally free from ice, of which there are many. I can cite many valid reasons for adhesion to the latter course. The Commerce Collegii Berattelse for ar 1877, Sveriges officiella Statistik, Utrikes Handel och Sjöfart, 1877, the latest official document extant states, p. 79, the export of deals and boards from Sweden in 1877 was—To the United Kingdom, 61,799,899 cubic feet; to France, 20,221,496 cubic feet; to Belgium, 4,978,092 cubic feet. And of timber or balks to United Kingdom, 5,968,378 cubic feet; to France, 2,200,000 cubic feet.

The prices obtained at the last public sales this month in London were for 3 by 9 in. Swedish deals 7s. to 13s. 6s., showing a variation of 6s. 5s. per standard. The cost of proposed railway, which will be protected from snow, will not exceed 500s. per English mile. The cost of delivering the Gellivare produce of iron or steel to an English port is based upon the extreme distance to the West of Sweden, and sea transport is 5s. a ton, which comprises a speedy redemption fund, repairs, insurance, telegraphy, and all land and marine working expenses, further 5 per cent. interest and 10 per cent. minimum dividend, with an exuberant management fund. Wood goods will be delivered at a moiety of present cost. Grain, iron, &c., at immeasurably lower rates. The industrial, railway, and steam shipping of Sweden will be immensely benefited, as arrangement could be made with the Government to deliver coal and coke in Sweden at a greatly reduced cost of transit. In a political point of view it is of vital importance in the actual state of Europe that British influence should be paramount in Sweden. The topographical difficulties to be surmounted on the line traced out are trifling. Before closing this letter I submit to the Government of Sweden, under the most powerful ægis, the incalculable advantages that would accrue to the "Bonde Stand," whereby their agricultural, farm, and game produce, as well as the salmon and other fishery, would find a ready and highly remunerative market in the United Kingdom, closed to them under the present system. In view of the very great benefit to the general mining, forestry, agricultural, industrial, fishery, and commercial interests of Sweden an interest guarantee will no doubt be accorded, subject to all the requisite material being indigenous in kind and manufacture.

The State will enjoy the best possible indemnity from being called upon to effect any disbursement consequent upon such interest guarantee, by the fact that a profit on hitherto existing transport can be proved more than ample to allow of a net dividend of upwards of 50 per cent. on the capital invested, the plant and exploitation enjoying perfect immunity from climatical charges, &c., incidental to existing railways.

If the Gellivare directors, penetrated with the "ipsissima verba" of the chairman of the general meeting on July 31, "The continued losses which the accounts unfortunately show without any hope of improvement, the only semblance of panacea we can hold out is that things have been so bad that they can scarcely be any worse. The directors have determined not to make any more iron. We are incurring expense upon a projected railway to the Gulf of Bothnia, which is extremely problematical." They cannot be otherwise than convinced that their position is truly deplorable—loss upon iron, wood, and farms, indebtedness amounting to the sum of 98,212, 11s. 3d. Similar to the Phoenix must be the action of the company. They must be actuated by the same spirit in the incipient state of the proposed measures, as evinced by them in the case of a projected railway to a port in the Gulf of Bothnia, closed by ice during seven to eight months in the year, in addition to their logs taking two years floating down to Lulea. Such a scheme carries one back to Mr. J. H. Tolme's report of Nov. 3, 1864, their then engineer, and is thoroughly below the notice of practical men, who have nothing but the interest of their mortgages and shareholders at heart, and are free from any entanglement as to profit accruing directly or indirectly to them, from the construction of a railway to a port little better than the Siberian rivers. In point of fact, timber can be laid down in Great Britain in shorter time from its felling in Siberia to what is done from the Gellivare province by

the Gulf of Bothnia. I have this allegation upon audiences with the Governor General of Western as well as the Governor General of Eastern Siberia, intimate personal acquaintances; further, with the acknowledged greatest Siberian explorer, and the shippers from the Petchora, and a thorough personal acquaintance with all the parts in question.

In stating so much I wish it to be perfectly understood that to carry out this undertaking recourse to their material support and influence can be dispensed with, as the zone whence the largest quantity of timber comes, and the wood that obtains the highest price in the English market, lies more to the south, finding outlet at Hernosand, Sundsvall, Soderhamn, Gefle, &c., all many months closed by ice. I have unsolicited been applied to by one of the chief mortgagees, apparently desolate with this interminable deplorable state of affairs, to whom I can for the present reply that with such men as Mr. Wilson and Sir John Henry Johnson on the board, of spotless integrity and unswerving probity, who will see affairs are too serious to brook further delay, they will apply an efficacious remedy. There are other iron deposits than those belonging to the Gellivare Company; indeed, there is no lack of such lying dormant for want of economical and practical means of fusion and transport. I have not excoagitated any large and startling theory, but have humbly submitted a practical simple system, based on deep thought and study since my first presentation to the late Berzelius in Stockholm, of world-wide notoriety. "Habet Deus suas horas et moras."

WM. JOSEPH THOMPSON.

20, Little Tower-street, Aug. 26.

MINERAL STATISTICS OF THE MINING RECORD OFFICE.

SIR.—The 1878 returns show the produce of the United Kingdom of iron ore to have been 15,726,370 tons, and obtained therefrom of pig-iron 6,381,051 tons, or 40.56 per cent. Now I cannot accept this return as anything approaching the truth. What becomes of the iron ore imported from Spain, &c., for mixing, which is ignored? If Mr. Hunt will kindly revise this return, or expunge it in toto, he will inspire confidence in his returns.

20, Little Tower street, Aug. 28.

WM. JOSEPH THOMPSON.

TREATMENT OF TIN ORES.

SIR.—Will you kindly allow me through the medium of your Journal to make some observations relative to the above subject, my object being simply to show what a very great saving may be effected in this most vital department of Cornish mining.

I will commence at the shaft's mouth. Here it has been customary from time immemorial to station a man to receive the tin-stone as brought from underground by kibble or skip into a tram wagon, and convey and deposit it into what is commonly called a slide. Now, should this said slide be only 6 ft. from the pit's mouth nothing more is required of this man than to attend to this work, therefore in many instances the poor fellow shivers with the cold in winter, and lies down and sleeps in the sunshine in summer, for want of more profitable (to the mine) employment. Then at the slide may be seen a staff of men using big sledges to reduce the larger rocks in the heap to a size suitable for the less muscular powers of the female spallers, who now appear on the scene, and are supposed to reduce the stuff to the proper size required for the stamps. In a great many mines may be seen a white jacket man, who from morning to night constantly moves about amongst those who are using these big sledges and smaller hammers, a very monotonous life surely. The next performance is the re-filling (duplicating the cost) of the mineral into barrows, wagons, or carts, and conveying of same to the stamps.

Now, let any unprejudiced mine agent reflect for one moment, and see the waste of time and money that attends this mode of working, and yet nothing can be more easily remedied by the adoption of trams and stone-breakers. In the first place, the stone-breaker should be large enough to receive the largest rock a man can put into the kibble or skip to send from underground; secondly, it should be fixed in such a position as to be accessible by tram-roads laid direct from the pit's mouth; and, thirdly, of sufficient height that the stuff after passing through the breaker might fall into tram-wagons, and be conveyed direct to the stamps passes; thus it is obvious with such a labour-saving system as this your white jacket man and his army of male and female spallers would be improved off the face of the mine, the only manual labour required being confined to the tramping of the stuff from the shaft to the stone-breaker, and from thence to the stamps-pass. Yet another and very material advantage to be derived by such a course of treatment is that the fracture of the hardest rock is so much more complete as compared with hand spalling that the same number of stamp-heads will do fully 20 per cent. more work. I have heard some agents argue that the situation of their mines was too low, &c., to carry out such a scheme; what a lame excuse, for can anything be more easy than to elevate the shaft-tackle sufficiently to give the necessary levels required for such a system.

I now pass on to the stamps, and will begin with the grates, which in many cases have been much neglected. The person having charge of the dressing department should first make himself acquainted with the size grain of tin with which he has to deal, and have the grates made accordingly, so that what is applicable to one mine in this respect may not be to another, some tin requiring to be stamped through a 36-hole or even finer size, whilst some require 32, some 28, or even rougher, so that if the rougher grain tin should be pulverised through the finer size grates, you would find the slimes richer, the loss of tin greater, and more expensive to dress; and if the finer grain tin is stamped through the rougher size grate the richer the dredge, &c. This brings me to the round buddle in front of the stamps, and my remarks on this will undoubtedly give rise to a great many differences of opinion. However, be this as it may, facts are stubborn things, and I am quite prepared to prove what I have for many years contended—that the round buddle is one of the worst appliances ever introduced into tin dressing, and that the sooner it is numbered with the things of the past the better; it receives the stuff from the stamps rough, fine, and slimes pell-mell. When full it is marked out by some one with a stick or some such instrument; the head part is then wheeled off to another buddle or kieve to be again treated, the middle head is heaved up to be again re-buddled, and the tail part is allowed to escape into the river, or put to the waste heap, as the case may be. The amount of labour and expense attached to this mode of working is frightful to contemplate, and classification, a thing which ought to be the chief aim of every dresser, is completely lost sight of.

What we want is machinery to economise manual labour, dispatch the work quickly, and save the tin. In order to do this the jigger process should be adopted, and here classification, already alluded to, can be introduced; sending the rough and fine into separate jiggers, which if properly handled will make the mineral pure, or fit for the calciner at the first operation, and without the aid of buddle or dolly-tub. After which you have the slimes pure and simple to be dealt with, and I feel certain that no sane man would use the round buddle in preference to frames for this class of stuff. (See Red and other rivers.) Sufficient tables should be erected to deal with the quantity of slime at command, so that when it leaves the last table it should be worthless.

I now arrive at the calcining house and floors, where a never-ending variety of processes are brought into play—such as buddling, tossing, chimming, &c., most of which, with their attendant labour cost, should be supplanted by the jigger, so fixed as to receive the work direct from the calciner. The waste whilst passing through the fire is made lighter, therefore it stands to reason that the easier the separation is made.

Now, look again at new tin mines starting, what an immense expenditure is required to lay out the floors. I might say to the tune of some 6000*l.* or 10,000*l.*; in fact, I could name some mines but do not wish to be personal, doing it even now in these depressed times, when at the same time if other appliances were adopted—such, for instance, as what I have alluded to—it could be done for less than one-half the amount.

In conclusion, I feel safe in saying if the reformation suggested be

carried into effect—i.e., from the collar of the shaft until the tin is made marketable—that every mine now in existence will realise more tin from the same quantity of tinstone, which is now escaping, with a saving of at least 50 per cent. in labour.

West Chiverton, Aug. 28.

RICHARD SOUTHEY.

SALES OF TINSTONE FROM CORNISH MINES.

SIR.—The recent advances in the price of tin ore and the present firmness of the metal market are very encouraging to those interested in mining, especially after such a long period of depression. But it has often been a matter of surprise to me that those mines which have apparently plenty of stamping power—or, at least, have ample means of providing it—do not stamp the tinstone and make it marketable on the spot, instead of selling it in the stone, as is often done, to those men who are significantly termed "bargain buyers." East Pool, for instance—a good mine, and paying dividends—sells large quantities to the parties referred to. Wheel Agar, too, adjoining East Pool, and some 250 fms. deep, with new stamps on the mine, erected years ago, but not yet set to work, sold last week 381 tons of tinstone, realising 362*l.* Wheel Prussia—a young mine some 40 fms. deep, and adjoining the Pevor Mines—sold last week 86 tons of tinstone for 84*l.*, besides selling about 60*l.* worth the previous week, but this mine has just been started with a new proprietary, and no stamping power has yet been fixed.

Illogan, Aug. 26.

OBSERVER.

MINES OF COUNTY OF CORK.

SIR.—Some time ago a lode was discovered in West Cork, and after much difficulty the terms for a lease were agreed upon. Several specimens taken from the lode, not more than 6 ft. under the surface, gave the following results:—

Sample of argentiferous ore from — Mine.

Copper 354 per cent.

Silver 346 ozs. per ton.

(Signed)

RICHARDSON AND SON, Swansea.

Assay of argentiferous ores from — Mine.

Silver 293 ozs. 17 dwts. per ton.

Copper 32 7-10 per cent.

(Signed)

JOHNSON AND SONS.

The intended lessee and discoverer of the mine died before arrangements were completed, and the mine still remains intact.

Cappagh Mine, Co. Cork, Aug. 25.

W. THOMAS.

LEAD AND LEAD MINING.—No. II.

SIR.—It is rather a singular coincidence that my suggestion that lead mines should, as far as possible, contract their sales of ore should have appeared in the same number of the Journal with the announcement of the Van directors that they intended to limit their output to their absolute necessities for keeping the mine in working order. The directors are deserving of the thanks of the whole mining community for setting this plucky example, and both they and their shareholders will find themselves richly rewarded in the end for their spirited policy, even should it result in temporary suspension of dividends. The lead market is firmer this week, and a total rise of about 30s. per ton may now be chronicled, and every appearance that the upward movement will continue, and that 20*l.* per ton will shortly be reached, the stocks of ore being undoubtedly very low, and the foreign demand daily increasing.

Referring again to the subject of lead mines as an investment, or speculation if that term is preferred, I may say that I read with a great deal of interest the discussion in your columns on the subject of—"Is it Right to Pay Purchase-money for Mines?"—and without wishing for a moment to enter fully into the subject, it seems to me to be pretty apparent and consistent with common sense that if a man possesses a property which is capable of yielding a yearly revenue he is certainly entitled to expect a consideration for handing such property over to the public, whether that property be a mine, or a farm, or a business, and without reference to how he may have acquired it or for what sum. On the other hand, in the case of lead mining, we too have often found large sums given without any certainty of any yearly revenue whatever, or with the certainty that no yearly revenue can be obtained without a large preliminary outlay.

Those well acquainted with lead mines know it is seldom that a property of that description is revenue-producing at the time of handing it over to the public. Therefore it is that there is a certain element more or less of risk in putting money into such speculations. Care and skill may reduce this risk to a minimum, but it can never be entirely removed, and if the investing public would bear this in mind there would be less disappointments and heartburnings in connection with mining enterprise than at present.

There are, broadly, two descriptions of mines generally presented for investment—(1) old mines which have proved productive in the past, but require further capital to develop; or (2) new discoveries more or less rich and promising, also requiring the aid of the public purse to open and develop. To select either as better than the other would be invidious and at the same time unjust, as both are in their way perfectly legitimate undertakings, and both are capable of leading to good fortune. But in ninety-nine cases out of a hundred neither one nor the other is worth the purchase considerations that it is the custom to put upon them. Every practical miner is perfectly well aware of this, and so are most of the mining brokers, but it is necessary to uphold the system which to them is bread and butter, especially the latter, who as a rule, which of course has its exceptions, know little or nothing of the science of mining or anything connected with it beyond a system of charging a commission of somewhere about 20 per cent. for disposing of shares. Few—very few—are members of the Stock Exchange, but anyone can call himself a stock and share broker by a payment of 5*l.* per annum to the Corporation, technically called broker's rent. It would be well for any intending investor to employ only a member of the Stock Exchange, who can always procure shares in really bona fide concerns. At the same time it is only fair to say there are some of the outside brokers who can be thoroughly relied on, but I need not say it would be impossible to give names.

There is another class who seek to push a business, and entrap the unwary, by the issue of private circulars, often in the form of newspapers or financial and investment guides, one or two of which have already been exposed in the columns of the London Press, the whole object of which is to press upon the reader the desirability of securing a few shares in some pet concern before they go to a premium, which they never really do.

The practical man, the mining engineer, or "captain," who really, as a rule, knows his business, is a mere tool in the hands of this class, who are the first to turn round on him and shift the blame to his shoulders when the game is played out. It is "owing to his reports and promises," &c., omitting to say that Captain X had to write his reports to order, or if he did not he might look for another place.

It is hard to suggest how all this is to be avoided, or how any intending investor is to steer between the shoals. Of course, the directorate of a company is a good guide, especially if gentlemen resident in the locality of the property are on it, as these latter, if not conversant with mining themselves, are able to form a very good idea of the bona fides of a concern from information to be had on the spot, far more so than London gentlemen, who are only taken down when everything is in apple-pie order. I shall be told that, as a rule, local gentlemen will not take any interest. No, because they know that three-fifths of the concerns are—well, I better not say what—that have been dished up under various disguises for years, if not generations. Names purposeless selected not to denote where the mine is, but to prevent it being identified at all.

I fear I am trespassing too much on your space—the more so as I know my remarks will only interest the non-practical part of your readers, but these are a numerous class, as your Journal finds its way into many a country fireside far away from the great mining centres; and, as I said before, it is to this class of your readers that I solely and entirely address myself. They are, after all, the great sources from which mining capital is drawn, and it is only fair they should see things as they are, not as painted; and

believing, as I do, that mining presents a very fair field for the investment of spare capital, with a hope of a good return, and, more, a chance of a rich one—and having many years experience—I do not think it inappropriate to your columns to let the investing public have the benefit of that experience whatever it may be worth. I have no intention puffing any particular concern up, or, on the other hand, of running one down; and I shall confine myself to what is within my own personal knowledge, my sole object being to induce capitalists to look with a more favourable eye on the industry of lead mining as a source of investment.

Aug. 27.

HOPEFUL.

PANDORA.

SIR.—I am obliged to Messrs. Watson Brothers for at last calling attention to this mine, and when they say "it is quite neglected by the market" it is only one of many similar instances that could be given of the market paying attention to mines that are not nearly so good as those that are "neglected." When the 700 shares were offered about the middle of last year the ore fetched upwards of 9*l.* per ton, since which it has gradually fallen to under 8*l.* per ton—the price lately obtained. It must also be remembered that a good steam-engine, for use when required, has been erected, so that the operations are now independent of dry seasons. I hope we shall soon have higher prices for lead, and then we shall see this mine hold a good position.

I suppose Messrs. Watson Brothers have good authority for what they write; for, if so, it is a satisfactory confirmation of what the directors have already told us.

Aug. 27.

A SHAREHOLDER.

PENSTRUTHAL CONSOLS

SIR.—In the Journal of the past two weeks appear anonymous letters imputing dishonest conduct to the large shareholders in this company. As secretary to the date of liquidation, and as being present at all the meetings of the liquidators since, I beg to state that such imputations are without a particle of truth. I have a personal knowledge of nearly all of the large shareholders, and can with certainty state that there is not one among them who would for an instant do anything but what is open and straightforward. I send this in the event of distant shareholders being misled by such letters.—London, Aug. 25.

EDWARD ASHMEAD.

TANKERVILLE MINING COMPANY.

SIR.—Permit me to call the attention of the Tankerville shareholders to the balance-sheet forwarded with the notice calling a meeting for September 2 next. I do not expect gentlemen to work for shareholders without remuneration, but when promises are made to do certain work at half fees until dividends are resumed I am with many others naturally surprised at the directors charging their full fees before the dividends are again paid. I hope this item of expense will not be swamped by the important negotiations to be brought before the meeting. I have advised my friends to sign and return the proxy in favour of the three directors therein named, and have yet to learn why the other Wolverhampton director is omitted. I hope no feeling of jealous sentiment will unsettle any one of the late new blood on whom such pressure is and has been made during the long depressed state of the lead trade.

Guildford, August 28.

T. M.

THE LEAD TRADE.

SIR.—Since I last addressed you advice to hand from New York confirm in a striking degree the reports about the limited stocks of lead available in that city, and speak very confidently of a further important rise during the autumn in the price of pig. The American price still rules nearly 5*l.* per ton above the quotation on this side, and it is believed that a further advance is inevitable. Taking into account the great revival in trade now going on in the United States, and the consequent increased demand for metals—notably iron and lead—it seems almost a certainty that before long pig must have an appreciable advance in this country also, as there must follow a great increase in the export trade; and, taking all the circumstances into consideration, such rise in price must be close at hand. In support of this view I would point to the diminished production of our own mines, which last year showed a decrease of nearly 2000 tons as compared with 1876, and this year it will, probably, be upwards of 4000 tons; and as the American production for the first half of this year also shows a falling off of nearly 3000 tons, it may be assumed that the decreased output of the two countries for the whole year will be 8000 to 10,000 tons; and, taking into account the fact that of late our imports from abroad also exhibit a very heavy falling off, it is probable that the entire decrease in the quantity available for the trade of the world will considerably exceed 12,000 tons. I see your correspondent, "Hopeful," estimates the deficiency at 20,000 tons. I do not, however, think it will be so much as that; but, assuming that it is about 15,000 tons, of which there is great probability, that would represent considerably more than one-third of our entire export trade based upon the average of the past three years, and at the present price of pig would result in a gain of 210,000*l.* to the English market, derived from foreign customers who have of late been dealing abroad. The decreased output from our own mines must tend to harden prices, apart from external influences. The Van Mine has just announced that only 200 tons per month will in future be sold (this in itself is equivalent to a reduction of 3600 tons per annum), and other large Welsh mines have for months past been restricting their output; but, besides the big mines, quite a host of young ones have ceased to sell ore; and having once stopped it may reasonably be inferred they will not be re-started in a hurry. True it is they individually produced but small quantities, but collectively their output was considerable.

When it is mentioned that at the end of last year in Wales alone the number of mines selling lead was 29 less than at the end of 1876 some idea may be gathered of the serious decline in this industry, and since then numerous other small undertakings have stopped production. The same state of things also exists in Spain, which country has of late years been our most powerful competitor in the lead trade, our imports from that country for 1878 having been, in round numbers, 77,000 tons. After the finish of the Carlist war Spanish lead mining received a great impetus from the high prices of lead then ruling, and scores of small mines which would not pay in ordinary times were set to work, the result being an important increase of production; but the depression of the past three or four years has caused several of these mines to collapse, and, like many of our own mines, when once stopped a considerable period must elapse before they are re-started, if ever. It is notorious that many of these properties are now being hawked about the City in the hope that English capital may be obtained to renew operations; but this is not at all likely when so many well-developed and promising mines in our country are languishing for want of the small amount of fresh capital which, if supplied at once, whilst labour and all mining materials can be obtained so cheaply, would speedily result in immense gain to the investor.

One other very cheering feature is the eagerness at present displayed by buyers for a prompt delivery of their ore. This points to the belief that the English smelters are but poorly supplied with the raw material, and that any revival in the demand for pig must quickly benefit the producer—i.e., the mining shareholder. I have lately heard of several well-authenticated cases where smelters have requested the mine manager to be extra expeditious in dispatching the ore, and have offered special inducements for so doing. This is a new feature, as some time ago these gentlemen seemed quite indifferent whether the ore was delivered in one or in three months after the date of purchase. Now they are eager to pay for it on the spot, and to get it delivered. It is much to be hoped that this scarcity will continue.

Will you allow me to correct a misprint which occurred in my letter which you inserted in the Journal of the 16th inst. It there appeared that the price of lead in New York was "410 cents" per lb., whereas I wrote "4.10 cents."

In conclusion I would remark that the future of the English lead trade looks brighter and more hopeful than for a long time past,

and there is every prospect of further improvement. It is daily becoming more apparent that the trade of the world has at last begun to mend. A new period of prosperity has already set in in America, whose trade with foreign countries shows an enormous increase, and who is now again taking large quantities of British goods. Of iron alone she has recently taken 10,000 tons from this country, besides 60,000 tons of rails, and her demands for other commodities are also considerable. This wave of prosperity will extend and reach our shores at no distant date, then will commence the revival in metals so long hoped for, and mine shares will, as they always have done, experience a great rebound, and I would repeat what I said in my previous letter—that mining investors, and especially investors in lead mines, should hesitate before they sacrifice their property now at what really appears to be about low water point, and they should remember that when a turn comes in mining affairs it is usually a rapid one, and that unsealable shares then quickly assume a tangible value.

City, August 28.

(For remainder of Original Correspondence, see to-day's Journal.)

THE SCOTCH MINING SHARE MARKET—WEEKLY REPORT AND LIST OF PRICES.

During the past week there has been less business doing, owing to the fortnightly settlement intervening, but the tendency of prices has been upwards. Particulars of the continuation business done are given below, and transactions now entered into are for settlement Sept. 12. In regard to trade prospects, the export department generally seems to be improving, particularly the iron and steel industries, but in the home trade there is more anticipation of a future recovery than any tangible evidence of such at present. The money market is firmer, owing to the unfavourable influence the persistent bad weather is having upon the crops.

In shares of coal and iron companies, the movements during the past week comprise a rise on Bolckow Vaughan (A) of 2s. per share, on Marbella of 4s. 6d., and on Monkland of 1s., while Benhar and Ebbw Vale are both rather easier. The Benhar shares have been selling at 23s. 6d. and 24s., but are now firmer. Glasgow Coal Exchange shares are quoted 40s. to 80s. Both the iron and coal trades are inclining towards improvement, and the general impression is that we are on the eve of better times. The American iron trade is now very good, and seems to be leading most others there to improve. The best proof of the revival there is that its effects are extending to this country, as it appears notwithstanding hostile tariffs that English houses can successfully compete for steel rail orders with the American firms on their own ground. The coalmasters in the West of Scotland are also about to raise their quotations, and though some time may elapse before a substantial turn for the better takes place in this department, there appears a chance of a rise in prices being maintained at no distant date, because the miners are restricting their output, as well as emigrating and going into other trades. Of course these are means of restricting the supply and not of increasing the demand. Nevertheless, at the present time their immediate effects are likely to be beneficial, though to persist in this policy, if similar improvement does not take place abroad, would have a disastrous effect on the export trade by encouraging foreign competition.

The Wigan Coal and Iron Company report a profit of 13,183, for the last half-year, so that the debit balance now stands at 3944. Bolckow, Vaughan, and Company consider it undesirable to pay an interim dividend for the past half-year, owing to the severe and prolonged depression in the coal and iron trades, and the Durham strike. The shareholders of the Silkstone and Dodworth Coal and Iron Company have decided to accept the vendors' proposal for the settlement of the dispute by vesting about 21,000 of the mortgage debentures held by them in a trustee for the benefit of the shareholders *pro rata*, and also to cancel their fully paid-up shares for about 50,000. Andrew Knowles and Sons are 11½ dis. Bilbwo Iron, 10 dis. ditto 8 dis. ditto 6 dis. Cardiff and Swansea, 15s. Company, A, 5s to 5½; ditto, B, 30; ditto (stock), 95 to 97. Cardiff and Swansea, 15s. Charles Cammell and Co., 30 dis. Chillingham, 40s. to 42s. 6d. Ebbw Vale, 78s. 9d. Great Western, 30s. John Brown and Co., 34 dis. Marbella, 29s. 6d. to 30s. 6d. Mersey Steel, 80s. dis. Muntz's Metal, 20s. prem. New Shirlston (preference), 65s. Newport Abercrombie, 5. Pelsall, 11½ dis. Rhymney, 18. Sandwell, 12½. South Wales, 60s. Tredegar, A, 13. Ulverston, 7 dis.

Shares of foreign copper and lead companies have had a good rise. Rio Tinto 5 per cent. have advanced 2s. per share; ditto 7 per cent. and Tharsis, each 10s.; while Canadian Copper are lower at 6s. to 7s. Tharsis shares after being dull at 21½ have come into good demand at 22 to 22½. Alamillos are 25s. Fortuna, 75s. Linars, 80s. New Quibada, 40s. Panatillo, 20s. to 30s. Pongibaud, 19. Rio Tinto 5 per cent., 71. York Peninsula (preference), 7s. 6d. to 10s.

There has been more business doing in home mining shares. Glasgow Caradon shares are firmer at 19s. 6d. to 20s. At the South Croft meeting on Friday a call of 2s. per share was made. The attention of investors should be directed to the West Pateley Bridge Lead Mine Company, which has of late been vigorously developed, and the present developments are sufficient to warrant the belief in such a successful future as enables the shares to be confidently recommended either as an investment or for a considerable rise than lead is firm, with every prospect of its improving in price. Killfrith tin shares keep low, although if the improvement holds good the mine will pay costs even at the present price of tin. Owen Brynno are at 30s. Carr Breas, 25. Cook's Kitchen, 45s. Dolcoath, 23. Devon Consols, 30s. East Caradon, 8s. 9d. East Lovell, 25s. Eddle Pool, 13. Great Laxey, 13½. Gunnislake (Clitters), 12s. 6d. to 15s. Herodfoot, 45s. Hingston, 10s. Killfrith, 3s. Leadhills, 40s. Mwyndy, 35s. Marke Valley, 12s. 6d. Parys Copper, 11s. Phoenix United, 40s. Roman Gravel, 8½. South Caradon, 52½. South Cundurrow, 11½. South Frances, 7. Tincroft, 9½. Tanqueray, 65s. Van, 15½. West Bassett, 95s. West Chiverton, 20s. West Frances, 5. West Selton, 20. West Tolgus, 23. Wheel Killy (St. Agnes), 7s. Wheel Jane, 25s. to 30s. Wheel Bassett, 20s. Wheel Peavor, 10. Wheel Crebor, 6s. 6d. Wheel Eby, 8s.

In shares of gold and silver mines Richmond are 1s. 3d. per share higher, at 7½ to 7¾; this week's run is 25,000. The profits at St. John del Rey—for June 6400, and for July 6800—were not considered good, but as the produce for the first division of August is slightly better it is likely that they will manage to maintain the 2½ per cent. dividend. In June there was a loss of 86l. at Antioquia, and a profit of 109l. at Frontino and Bolivia, the mine reports in the latter case being very encouraging. The Port Phillip Company has received advice of remittance for 600l. for month ended August 13. The produce at Don Pedro for first division of August is 1100 ozs. The profit at Almaden and Tivito for second quarter of 1879 has been 85400. Colorado United are 30s. Eberhardt, 42s. 6d. Exchequer, 2s. 6d. to 5s. Flagstaff, 3s. 6d. to 4s. 3d. Javali, 5s. to 7s. Port Phillip, 8s. 9d. to 9s. 6d. Pestana United, 3s. to 5s.; ditto 12½ per cent. (preference), 17s. to 19s. United Mexican, 50s.

In shares of oil companies, the principal movement is a rise of 7s. 6d. per share on Broxburn. Young's Paraffin have been selling at 13½ and 13¾. Runcorn Soap, 8 dis. The meeting of Price's Patent Candle Company will be held Sept. 25.

In shares of miscellaneous companies, there is a rise of 11. 10s. per share on London and Glasgow Engineering. Earle's Shipbuilding are 25 dis. Native Gunno, 50s. In wagon companies shares, Scottish are 10s. lower at 8 to 8½, and the new shares are also offered at 55s. The dividend of the Birmingham Company is only 7½ per cent. this year, against 10 per cent. last year. British and South Wales shares are 6½, Gloucester 5½, Metropolitan 32s. 6d. prem. Midland 7½, Railway Carriage 70s., and Swansea 30s. In chemical companies shares, business dull. At the meeting of Luwes' Company, to-morrow, the dividend to be recommended is only 5 per cent., against 9 per cent. last year, this unfavourable result being, no doubt, due to the agricultural depression. Luwes' preference and ordinary shares are, however, steady, the latter at 7½ to 7¾. Langdales, 60s. to 65s. Newcastle, 40s.

WEST MARY ANN.—In about six weeks the manager hopes to open or sink on the lead lode below adit at this mine. There is a winze gone down 15 fathoms, which they are cutting down to shaft size, and in it is a most kindly lode. The monthly costs are not much over 50l. In consequence of the bank failures shares in this mine are at present very low, and should be secured for a good rise between this and Christmas.

GLASGOW CARADON CONSOLS.—The last monthly sale of copper ore by this company—180 tons computed—on the 21st inst., realised 666l. 3s., or an average of 74s. per ton; the previous month's sale was 190 tons at 73s. 21., while the sales in the month of August for some years past have been—in 1878, 205 tons, at 7s. 10d.; in 1877, 250 tons, at 84s. 8d.; in 1876, 250 tons, at 76s. 4d.; in 1875, 245 tons, at 18s. 1d.; in 1874, 235 tons, at 99s. This is the company's eighth sale for the current financial year, and the proceeds of these sales compared with those for the corresponding sales of 1878 show a decrease of 774l.; but this is more than accounted for by 244 tons less ore having been sold, as the company in the present depressed state of trade consider it the best policy to restrict the output.

The following calculations show the yield per cent. on money invested at present prices in the shares named, based upon the last average yearly dividends being maintained:—In chemical and oil companies, Millbay Soap would yield 6½; New Patent Candle, 5½; Oakbank Oil, 9½; Odam's Manure, 7½; Price's Patent Candle, 6½; Uphall Oil, 6½; Victoria Soap, 6½; Western Counties Manure, 7; and Young's Paraffin, 8. Scottish Wagon shares would yield 5½; and United States Rolling Stock 5½. Scottish Australian Mines would yield 8½, Tharsis Sulphur 6½, and ditto (7½ paid) 6½.

ERRISBEG MINING COMPANY (Limited).—This company's property is situated at Roundstone, county Galway, and consists of about 150 acres. The mining operations of the company are represented by (1) Annie's shaft, being the main shaft, 51 ft. deep; (2) Hallam's shaft, 48 ft. deep; (3) the main adit level driven from Annie's to Hallam's shaft, 240 ft. in length, and within 60 ft. of the latter, with which it is intended to be connected and drain; (4) the south shaft, or the original shaft, 36 ft. deep; (5) the south adit level 160 ft. in length; (6) the 7 ft. level from Annie's shaft, driven 17 ft.; and (7) Molyneux adit level, driven 300 ft. There are also several exploratory shafts, levels, and surface excavations. The surface works consist of two large reservoirs, partly completed, constructed on the sides of the hill overlooking the works, also lime kiln, &c. There is a large assortment of useful plant, material, and machinery purchased at a remarkably low price. The district presents favourable geological formations. The ore consists of sulphides, oxides, and carbonates of copper, and is contained principally in two parallel quartz lodes running north and south. The main lode is 20 ft. wide

at surface, and the ore occurs not only in strings and bunches, but is freely scattered throughout the matrix, which consists of quartz, chert, calcite, and kiesel. Lead ore has been found at one or two points, and manganite or iron pyrites occur plentifully in most of the cross-veins. The monthly cost is 5/1 to 6/1. The leave is for 21 years, from 1876, at a minimum rent of 1/20th with a royalty of 1/16th. The capital is 20,000l., in 2s. shares, which are at present at par.

On Contango day (Tuesday) the following were the rates of continuation current:—Contango: 1¼d. on Benhar Coal; 1d. on Glasgow Caradon; 1d. on Huntington Copper; 1d. on Marbella; 2d. on Oakbank Oil; and 3d. on Tharsis. Backwardations: 3d. on Richmond Mine; 6d. on Tharsis; 3d. on Uphall Oil; 1s. 6d. on Young's Paraffin. On comparing the making-up prices of the following shares fixed to day with those of the same shares at previous settlement the variations so shown to have occurred in the past fortnight are: Glasgow Port Washington (A) have advanced 12s. 6d. per share; Clyde Coal, 5s. 6d.; Huntington Copper and Broxburn Oil, each 5s.; Marbella and Monkland, each 3s.; Uphall Oil, 2s. 6d.; Tharsis, 1s. 3d.; and Oakbank, 6d. On the other hand, Ebbw Vale have declined 17. 6d. per share; Young's Paraffin, 2s. 6d.; Tharsis (new), 1s. 3d.; and Canadian, 3d. The remainder are unaltered; Benhar Coal, Glasgow Caradon, Glasgow Port Washington (B), and Rio Tinto shares.

MELLANEAR COPPER MINE COMPANY (Limited).—This Cornish mine has been worked about 3¼ years by the present company, and for the last two years has been paying dividends. In all 10s. per share, out of 2½ paid up, has been returned to the shareholders, besides creating a reserve fund of about 700l., and writing off all the preliminary expenses over 700l. The mine now is as good as ever. The ends are all fairly productive, and the stops that are working yield an average 5 tons per fathom. The dividends and meetings are half-yearly, the next meeting in September. This has every appearance of being a lasting concern, and the shares are mostly held for investment. They have been done at 90s., but the low price of copper lately has caused them to go back at 65s. to 70s. It is satisfactory to notice, however, that copper is, in common with other metals, improving in price, and as this mine is at present producing at the rate of 8000 tons a year, a small advance in the price of the ore will make a great advance in the dividends.

Per share.	Paid up.	Dividends.	Description of shares.	Last price.
10	25	2 5	Arncliffe Coal (Limited)	6½
10	10	4	Benhar Coal (Limited)	24s.
100	60	25s. 1	Bolckow, Vaughan, and Co. (Lim.) A	55
10	10	10	Calcutta Gas Coal (Limited)	6½
10	10	4s. 1	Chillingham Iron (Limited)	41s. 3d.
10	10	10	Clyde Coal (Limited)	75s.
23	30	10s. 1	Ebbw Vale Steel, Iron, and Coal (Lim.)	9d.
10	10	10	Fife Coal (Limited)	75s.
10	10	10	Glas. Port Washington Iron & Coal (L) B	60s.
10	10	10	Ditto A	57s. 6d.
10	10	10	Lochore and Caplehead (Limited)	15s.
10	10	10	Marbella Iron Ore (Limited)	30s.
10	10	10	Monkland Iron and Coal (Limited)	31s.
100	100	100	Ditto Guaranteed Preference	50s.
10	10	10	Nant-y-Glo & Blaenau Ironworks pref. (L)	16½
6	6	6	Orma & Cleland Iron & Coal (L & Red.)	5s. 6d.
1	1	1	Scottish Australian Mining (Lim)	37s. 6d.
1	1	1	Ditto New	17s. 6d.
Stock	100	100	Shotts Iron	40
4	4	4	CANADIAN COPPER AND SULPHUR (Lim.)	6s. 9d.
10	7	7	Cape Copper (Limited)	28
1	1	1	Glasgow Caradon Copper Mining (Lim.)	19s. 6d.
10	15s.	15s.	Ditto New	11s. 6d.
4	4	4	Huntington Copper and Sulphur (L)	25s.
10	10	10	Panatlillo Copper (Limited)	22s. 6d.
10	10	10	Rio Tinto (Limited)	80s.
20	20	7	Ditto 7 per cent. Mortgage Bonds	16½
100	100	5	Do. 5 p.c. Mor. Deb. (Sp. Con. Bds.)	70
10	10	10	Tharsis Copper and Sulphur (Lim.)	22½s. 3d.
10	7	7	Ditto New	14½s. 3d.
1	1	1	York Peninsula Mining (Limited)	8s. 9d.
1	1	1	Ditto 15 per cent. Guaranteed Pref.	10s.
1	1	1	Australasian Mines Investment (Lim.)	5s.
5	5	10s. 1	Richmond Mining (Limited)	7½
10	8½	8	Broxburn Oil (Limited)	13
10	7	5	Dalmeny Oil (Limited)	7
1	1	15	Oakbank Oil (Limited)	41s.
1	5s.	15	Ditto	10s. 6d.
10	10	2	Uphall Mineral Oil (Limited) A	5½
10	10	10	Ditto B Deferred	10
10	8½	17½	Young's Paraffin Light & Mineral Oil (L)	13½
50	25	5	LONDON & GLASGOW ENGINEERING & IRON SHIPBUILDING (Limited)	18
7	7	5	Phospho Guano (Limited)	5½
10	10	5	Scottish Wagon (Limited)	8½
10	4	5	Ditto New	55s.

NOTE.—The above lists of mines and auxiliary associations are as far as can be ascertained. Scotch companies only being inserted, or those in which Scotch investors are interested. In the event of any being omitted, and parties desiring a quotation for them, and such information as can be ascertained from time to time to be inserted in these lists, they will be good enough to communicate the name of the company, with any other particulars as far as possible.

J. GRANT MACLEAN, Stock and Share Broker.

Post Office Buildings, Striving, Aug. 28.

FOREIGN MINING AND METALLURGY.

First-class canal works have been projected in France, which, if fully carried out, will involve an outlay of 28,480,000l. When these works are all executed the first-class canals of France will have an aggregate development of about 11,800 miles. The extent of the second class canals of France is to be increased to 6800 miles, at an estimated cost of 8,640,000l. The expenditure contemplated—something over 37,000,000l. in all—is to be spread over six or seven years—so that the financial resources of the country are not at all likely to be overtaxed. The production of coal in the Valenciennes basin last year amounted to 3,240,000 tons, as compared with 3,286,600 tons in 1877; all the local colliery companies, with the exception of Aniche, reduced their production last year. The average selling price last year was 9s. 8d. per ton, as compared with 10s. per ton in 1877. The production of coal in the Pas-de-Calais continues to increase, having amounted last year to 3,829,851 tons, as compared with 3,435,041 tons in 1877, 3,336,919 tons in 1876, 3,257,509 tons in 1875, and 2,793,789 tons in 1874. The production thus increased last year to the extent of nearly 11½ per cent. The production of the Pas-de-Calais exceeded that of the Loire last year by about 650,000 tons.

Industrial coal has been disposed of tolerably readily in Belgium, metallurgical industry having been a considerable consumer. Attention begins also to be devoted to coal for domestic consumption during the ensuing winter season. A contract is to be let in October for the supply of the coal required in the military bakeries of the 16 garrisons of Belgium.

A sale of coal has been made at London by the Hibernia (Germany) Company. It is expected that the collieries of North Germany will considerably extend their field of operations when certain canals to Hamburg are completed, and when the German Government has introduced upon the German Government railways a reduced tariff, which it has now in contemplation. The Turkish Government has just caused a survey to be made of the coal basin of the Black Sea by a mission comprising a rather numerous staff at the head of which were two French engineers and an Inspector-General of Forests. It appears to have been definitely ascertained that coal extends without interruption from Reussé Agbi to Amashera, a distance of nearly 90 miles, the breadth of the deposit being also very considerable. The basin is evidently one of great richness, and it was worked by the English during the Crimean war; the indolence of the Turkish Government has, however, thus far spoilt everything.

Industrials in Belgium have generally work on hand, but they complain bitterly of the unremunerative prices at which they have to take it. Under these circumstances, they remark, they scarcely live, they merely vegetate. The steelworks, like the iron rolling-mills, of Belgium are endeavouring to develop an export trade, but they meet with general competition upon foreign markets—competition which appears to be increasing. Upon the whole, the Belgian metallurgical situation does not improve. A second line of rails is about to be established between Haverin and Marloie, at an estimated cost of 17,880l.; this work will absorb, of course, a small quantity of material. The administration of the Belgian State railways has decided to show at the Brussels Exhibition of 1880 specimens of the various trucks, carriages, and locomotives in use upon the system. It has been suggested that the administration should extend its exhibit to fixed plant, such as rails, turn tables, and switches.

In the French department of the Haute-Marne the demand for iron has been tolerably good; sheets have especially been in request. In the Meurthe-et-Moselle prices continue to be well supported. In the Nancy district pig with prompt delivery has sold at 43s. 3d.

per ton. In the Loire-et-Rhône the demand for plates, which has been tolerably active of late, has acquired quite an exceptional importance during the last few days. Transactions have at the same time been concluded at about previous rates.

FAR WEST IN COLORADO.

[FROM A CORRESPONDENT.]

You will perceive that I am not in the San Juan Region, I am to the north of it—on Rock Creek. The mines here are numerous, and some of them, I think, are rich; but none have been developed. The leads are enormous—one, the Whale, is 60 feet wide; they average 5 to 12 feet in width. The ore as thus far developed runs gold, copper, and silver, but is all low grade. It improves, however, with the development of the leads. The Terrible, which assayed 25 ozs. on the surface, now at a depth of 10 feet assays 95 ozs. There has been quite an excitement at Copper Creek, a place 10 miles from here. When we camped there several weeks ago there was not a soul except ourselves on the ground. Now there is a town—Gothic City—and a population of 400; there are two saw mills, a smelter, and several stores in the place. The cause of the excitement was the discovery of horn or wire silver in a lead owned by the Jennings Brothers; since the discovery several rich strikes have been made. The average run is from 1500 to 1800 ozs.

The last excitement in this neighbourhood is on Coal Creek, about 27 miles due west from here. Ore from the Ruby Chief has assayed 2200 ozs. There have been several other rich discoveries. Our whole camp, about 30 men, left for that quarter yesterday. They are to be gone two weeks. My man went with the party; I sincerely hope he will find something, and return with the horses and his scalp on his head; for Coal Creek, you must know, is on the Indian Reservation. The miners, of whom there are from 300 to 400 on the ground, have an understanding amongst themselves, that there is to be no jumping of their questionable claims; and it is confidently believed that the Indians will be removed before another year, and the property thus secured to the adventurers. But going in on the Reservation is risky business at the best. There is not a newspaper published in this region; if I can find a San Juan paper I will send it.

Elk Mountain, Colorado, July 24.

THE WILD DUCK, OR SPORTSMAN'S ARMS.

"What do ee think, Uncle Henry?" says Old Tom; "why I heerd some people telling the other day that tin could be rose and dressed for 25l. a ton." "Well," says Uncle Henry, "tis time to cut down the cost, and when the capn dressers can send tin to market for 20l. a ton, and stop the thousands of pounds' worth washing down the Red river every year, our tin mines needn't be one bit afeard of all the furrin mines in the world." "But, my dear men," says Jan Temby, "you must have a little patience, and I don't doubt but some clever fellow will invent something to catch the tin now running away from the dressing-floors and when Old Tom's machinery for 'dry dressing' is put to work you will see tin sent to market for 15l. a ton." "That's true," says Old Tom, "for the adventurers now pay for rising, haling, stamping, budding, and no end of washing, so that what's saved from the water cannot cost much less than 30l. a ton, and if the could stop what is now going to Red river it would bring down the cost to 20l. a ton. My 'dry dressing' would save all the tin, and I am sure the cost would not be more than 15l. a ton. A tin lode will turn out a certain number of tons of stuff to the fathom; then, after 'tis brought to grass, when it is stamped to fine slime, a great part is allowed to run away. That's the way what's left cost so much money in dressing. The big capn dressers may say what the mind to, but this is the truth, and the can't deny it." "It's my opinion," says Jan Jewell, "that great improvement may be made in dressing copper, as well as tin, and the time will come again when we shall have plenty of copper mines at work. Our old county is not done yet for copper bales. Water when rightly used is of great value, but there is too much used in dressing ore. It is like a cow filling a bucket with milk, and then kicking it over. All ore must be dressed dry, or we shall never know what is lost." "I had a long discourse the other day," says Jimmy Dowd, "with Uncle Jan Oppy; poor old fellow, he is nearly done, but was a grand old tributer in his day. We have very few tributers now, and network men are only living boring machines. Uncle Jan begun to tell about the old capns, and with all our schools and learned institutions I don't think the young capns of our day can beat the old capns, for, said Uncle Jan, in former times the old capns wor good diallers, and science or no science, the work the did is still to be seen, and I reckon it would puzzle most of the learned young capns to do what the old ones did. In the days the old capns could do their work like men, and would so soon think of calling in an old woman as a land surveyor to do their dialling." "I can very well mind," says Uncle Jan, "when Harriett's shaft, Dolcoath, was sunk from grass about 200 fathoms—that was sinking and rising all going on at the same time. There wor miles of levels to dial to get to the right point, and it was all done, without land surveyors, by the old capns, and no man can tell where the shaft was holed in rising or sinking. Now," says Uncle Jan, "all the learned men of all the learned institutions could not do a better job than this, and I doubt if some of them could do it at all, and I should like to know what any of them can do that the old capns did not do, nor can all the new plans for dialling do more than was done at Harriett's and scores of other places by the old capns 70 years ago." "Well," says Uncle Henry, "I can tell ee about another clever bit of dialling at Treasvane Mine many years ago—that was for the sinking of Harvey's engine-shaft, which was sunk through a hard granite rock, but by good dialling by the old capns, this shaft—not an inch of which was sunk except by blasting—by having pares of men rising and sinking at the same time, was opened from grass to the depth of 271 fathoms in the short space of two years and one month. This work was done by the old capns in the old-fashioned way of dialling, and still to mistake was made, nor could any man tell where the shaft was holed in rising and sinking. If," says Uncle Henry, "the scientific institutions and mining schools of the present day can beat this I should like to see it done. The old capns were well able to do their work, and made no fuss about it, or great speeches, for now there is nothing but speeches so long as your arm, go where you will—it seems to me about nothing—and if some good don't come from all the mittens and all the long speeches, or some improvements made, or something better done than was ever done before, what's the good of all the speechifying? A man must learn before he can teach, and nowadays we have all teachers and no scholars, and all the fount is put down to furrin tin and copper." "You appear, Uncle Henry," says Cousin Will, "to be opposed to all scientific knowledge, but without science applied to the working of our deep mines I don't see how they could be kept going." "I am," says Uncle Henry, "for all real improvements, and you may call it science if you have a mind to, but when I hear my boy Tommy reading great long speeches in the newspapers it is a wonder to me how the are not ashamed to see it. If any man will show the way to save coals, and make the engines do more duty, reduce the cost from top to bottom in working mines, save the tin and copper from washing away in the rivers, and discover new and good bales of tin and copper—when this is done I will agree with you, Cousin Will, that scientific knowledge is the right thing, and a purty lot better than making long speeches." "You have told us, Uncle Henry, what would be real improvements in mining, and if you will hark to me for a bit I'll tell ee," says Jan Temby, "what's no improvement, and all the science classes in the county can't contradict it. 'Four-weeks months' is no improvement, nor 'short extents,' nor 'stopping tribute pitches,' nor working 'short coals,' nor cutting off 'sist,' nor making poor men work 'two months' before the get one month's pay, nor making men go in debt to the shops. I'm sure you will all agree, comrades, that the few things I have mentioned are no improvements upon the old plan." "No," says Old Tom, "but will keep poor men in debt and poverty to the end of their days, and every man should have money twice in every month to buy what he needs for ready money, or he will never be able to hold up his head."—From Cousin Jack's Unpublished MSS.

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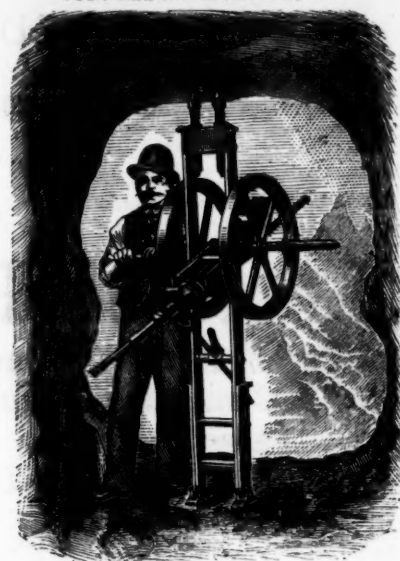
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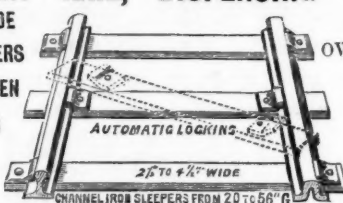
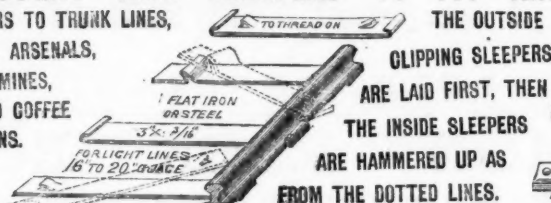
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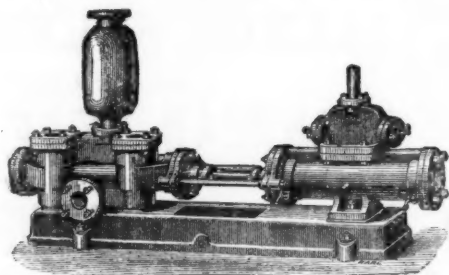
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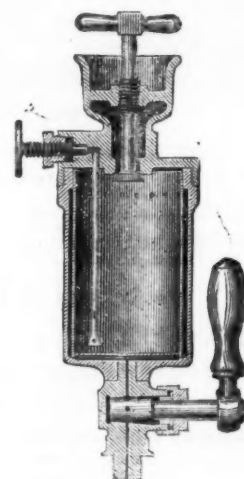
PATENT LUBRICATORS,

Entirely Self-acting. Flow of Grease regulated
by the Steam. Perfect Lubrication.
Greatest possible Economy.

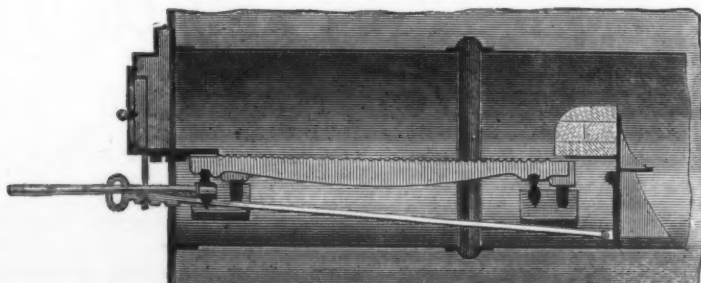
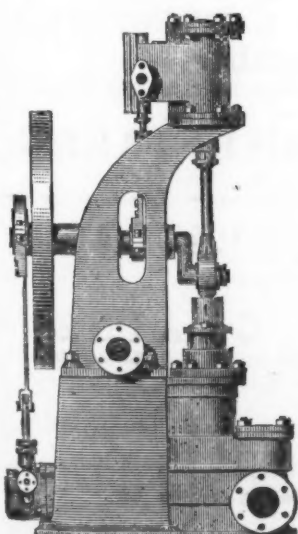
PRICES OF A FEW LEADING SIZES.

Steam cylinder.	Water cylinder.	Stroke.	Gallons per hour.	Price.
3	1 1/2	12	720	£16
4	2	18	1,200	19
4	4	18	5,040	25
6	4	18	4,280	33
6	6	18	9,660	41
8	6	18	7,920	50
10	8	18	12,060	80

PATENT.



PRICES ON APPLICATION.



IMPROVED SMOKE PREVENTING FIRE BARS.

TO SUIT ANY
FLUE
OR
FURNACE.
—
PRICES
ON
APPLICATION.

PRICES OF LUBRICATORS.

No.	Horse-power.	Price.
1	Agr cultural	7s. 6d.
2	Engines...	10 0
3	5 to 7	20 0
4	7 10	25 0
5	10 20	30 0
6	20 30	37 6
7	30 50	47 6
8	50 70	60 0
9	70 100	85 0
10	100 200	110 0

At the PARIS EXHIBITION the Jurors have Awarded

THE GOLD MEDAL, THE SILVER MEDAL, AND HONOURABLE MENTION
FOR MY LATEST PATENTED STONE BREAKERS AND ORE CRUSHERS.

Stones broken equal, and Ores better, than by hand, at one-tenth the cost.

H. R. MARSDEN,

ORIGINAL PATENTEE AND SOLE MAKER OF BLAKE'S

Improved Patent Stone Breakers & Ore Crushers.

New Patent Reversible Jaws,
in Sections, with Patent
Faced Backs.

NEW PATENT ADJUSTABLE
TOGGLES.

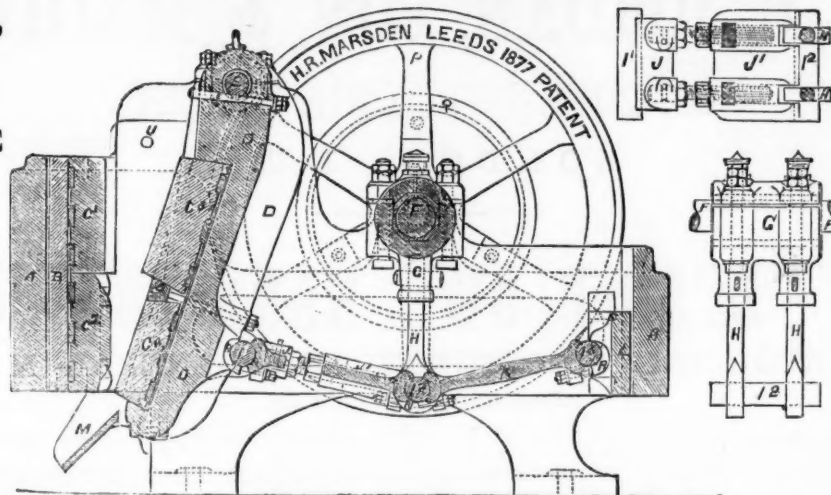
OVER **2500** IN USE.

New Patent Draw-back
Motion.

NEW PATENT STEEL TOGGLE BEARINGS.

70

PRIZE MEDALS.



READ THIS—

Wharfedale Lime Works, Maryport, Whitehaven,
November 7, 1878.

H. E. MARSDEN, Esq., Soho Foundry, Meadow-lane, Leeds.
DEAR SIR,—The machine I have in use is one of the large
size, 24 in. by 12 in. The quantity we are breaking daily with
this machine is 250 tons, the jaw being set to break to a
size of 2½ in. We have, however, frequently broken over
300 tons per day of ten hours, and on several occasions over
350 tons during the same period. The stone we break is the
blue mountain limestone, and is used as a flux in the various
ironworks in this district. We have now had this machine in
daily use for over two years without repairs of any kind, and
have never had occasion to complain of any inconvenience in
using the machine. I hope the one you are now making for
me may do its work equally well. The cost—INCLUDING EX-
GINE-POWER, COALS, ENGINEMAN, FEEDING, and all EXPENSES
OF EVERY KIND—is just 3d. per ton. Should any of your
friends feel desirous of seeing one of your machines at work,
I shall have much pleasure in showing the one alluded to.
I am, dear Sir, yours very truly,
WILLIAM MILLER.

AND THIS—

Wharfedale Lime Works, Aspatria, Cumberland,
July 11th, 1878.

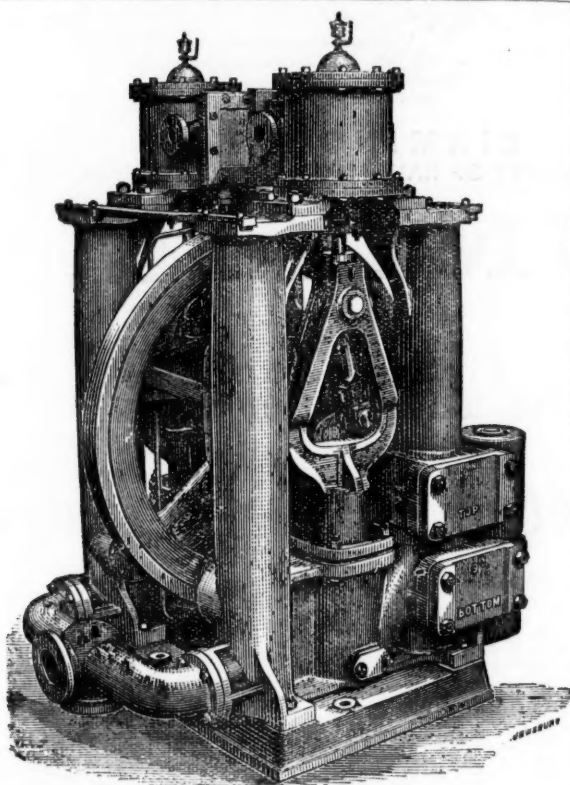
H. R. MARSDEN, Esq., Soho Foundry, Leeds.
DEAR SIR,—We are in receipt of your letter of 4th inst. I
may just state that the stone breaker above named has been
under my personal superintendence since its erection, and I
have no hesitation in saying that it is as good now as it was
five years ago.
I am, dear Sir, yours faithfully,
FRANCIS GOULD.

GREATLY REDUCED PRICES ON APPLICATION.

ALL BEARINGS are renewable, and made of H.R.M.'s Patent Compound ANTIFRICTION METAL.

CATALOGUES, TESTIMONIALS, &c.

H. R. MARSDEN, SOHO FOUNDRY, LEEDS, ENGLAND.



STEAM PUMPS for COLLIERY PURPOSES, specially adapted
for Forcing Water any height; also for Sinking; and for Feeding
Boilers.

JOHN CAMERON has made over SIX THOUSAND.

WORKS: OLDFIELD ROAD, SALFORD, MANCHESTER.

ASBESTOS.

ASBESTOS ENGINE PACKING,
ASBESTOS MILLBOARD JOINTING,
ASBESTOS BOILER COVERING,
ASBESTOS CEMENT,
ARE UNRIVALLED.

Sole Patentees and Manufacturers:

THE PATENT ASBESTOS MANUFACTURE CO. (LIMITED),
31, ST. VINCENT PLACE, GLASGOW,
AND 10, MARSDEN STREET, MANCHESTER.
From whom Price Lists and all information can be had.

THE GREAT ADVERTISING MEDIUM FOR WALES.

THE SOUTH WALES EVENING TELEGRAM
(DAILY), and
SOUTH WALES GAZETTE
(WEEKLY), established 1857.

The largest and most widely circulated papers in Monmouthshire and South Wales
CHIEF OFFICES—NEWPORT, MON.; and at CARDIFF.

The "Evening Telegram" is published daily, the first edition at Three P.M., the
second edition at Five P.M. On Friday, the "Telegram" is combined with the
South Wales Weekly Gazette, and advertisements ordered for not less than six
consecutive insertions will be inserted at an uniform charge in both papers.
P. O. O. and cheques payable to Henry Russell Evans, 14, Commercial-street
Newport, Monmouthshire.

THE NEWCASTLE DAILY CHRONICLE
(ESTABLISHED 1764.)
THE DAILY CHRONICLE AND NORTHERN COUNTIES ADVERTISER
Offices, Westgate-road, Newcastle-upon-Tyne; 50, R. & A. street North
Alders, 195, High street, Sunderland

THE "CHAMPION" ROCK BORER

MINE AND QUARRY STANDS, STEEL DRILLS, SPECIALLY PREPARED INDIARUBBER HOSE, TESTED
IRON PIPES, &c.



Air-Compressing Machinery,

Simple, strong, and giving most excellent results, and
ELECTRIC BLASTING APPARATUS.

Full particulars of rapid and economical work effected
by this machinery, on application.

R. H. HARRIS, late

ULLATHORNE AND CO., Mechanical and Consulting Engineers,
43, QUEEN VICTORIA STREET, LONDON, E.C.

PARIS EXHIBITION,



1878.

HONOURABLE MENTION

Awarded to

SALMON, BARNES, & CO.

FOR THE PATENT

ROANHEAD ROCK DRILL,

AND THE HIGHEST AWARD FOR

IRON AND WOOD REVOLVING SHUTTERS,

Worked by their PATENT BALANCE-WEIGHT MOTION.

Canal Head Foundry and Engineering Works, Ulverston,
LANCASHIRE.

PARIS EXHIBITION,



1878.

GOLD MEDAL AWARDED, PARIS EXHIBITION, 1878.

THOMAS TURTON AND SONS,

MANUFACTURERS OF

MINING STEEL of every description.

**CAST STEEL FOR TOOLS. CHISEL SHEAR, BLISTER, & SPRING STEEL
MINING TOOLS & FILES of superior quality.**

EDGE TOOLS, HAMMERS, PICKS, and all kinds of TOOLS for RAILWAYS, ENGINEERS, CONTRACTORS, and PLATELAYERS.
LOCOMOTIVE ENGINE, RAILWAY CARRIAGE and WAGON SPRINGS and BUFFERS.

SHEAF WORKS and SPRING WORKS, SHEFFIELD.

LONDON OFFICES.—90 CANNON STREET, E.C. PARIS DEPOT.—12, RUE DES ARCHIVES

J. WOOD ASTON AND CO., STOURBRIDGE

(WORKS AND OFFICES ADJOINING CRADLEY STATION),
Manufacturers of

CRANE, INCLINE, AND PIT CHAINS,

Also CHAIN CABLES, ANCHORS, and RIGGING CHAINS, IRON and STEEL SHOVELS, SPADES,
FORKS, ANVILS, VICES, SOYTHES, HAY and CHAFF KNIVES, PICKS, HAMMERS, NAILS,
RAILWAY and MINING TOOLS, FRYING PANS, BOWLS, LADLES, &c., &c.

Crab Winches, Pulley and Snatch Blocks, Screw and Lifting Jacks, Ship Knees, Forgings, and Use Iron of all descriptions.
STOURBRIDGE FIRE BRICKS AND CLAY.